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ABSTRACTS OF TUBERCULOSIS

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Abstracts of Tuberculosis *is published at intervals as an integral part of the* **American Review of Tuberculosis.** *It will receive separate paging and may, if desired, be bound separately at the completion of the volume.*

The Abstract Editor is Dr. George Mannheimer, 41 West 51st Street, New York City. Prompt transmission to him of reprints or abstracts of papers on tuberculosis, sanatorium or board of health reports, etc., will promote their early publication in this section.

Abstracts should be sent typewritten on one side of the page only. They should be as concise and compact as the subject matter of the article warrants. They should be headed with a short title, and followed by the full title of the paper, author's name, journal, date, volume and page

Enlightening the Public.—The basis of the modern fight against tuberculosis is enlightenment, instruction and education of the public. This is carried on mostly by pamphlets and printed rules. Usually the patients read and understood them either imperfectly or not at all. The author proved this by giving the patients verbal orders to bring in specimens of sputum and urine with the result that almost every one complied with the order. To another group of patients he handed pamphlets in which he enclosed slips on which were printed the same directions. The results were less good. The third experiment in which he printed the same directions inconspicuously on the second page of the pamphlet had the result that practically all patients failed to bring in the specimens. He therefore places little value on printed matter and tries to carry on all education and instruction verbally. Special informatory and advisory office hours were instituted at the *Fürsorgestelle.* Special lectures are given with open discussions and practical demonstrations. They are so well attended that it has become necessary to hold them in a larger hall. There will always be people who can learn from printed directions, but the great mass of the people will follow verbal instructions better.—*Von welcher Art der Aufklärung darf man den grössten Erfolg erwarten—Beschorner, Tuberculosis, October, 1920, 251.*

Interesting Things About Tuberculosis.—There is probably no condition that presents a more varied array of symptoms than incipient tuberculosis. The fact that a patient has tuberculosis does not rule out the presence of other diseases. The patient's chances for recovery depend greatly upon how early the disease is discovered and how successfully it is treated. Among the more common tuberculous manifestations are pleurisy, laryngitis, adenitis, fistula, meningitis, ostitis, arthritis, colitis, and peritonitis. At the present time the old idea prevails that the West is the only place in which one suffering from tuberculosis can recover. It is more important to live the proper life and to learn to take precautions to prevent the spread of the disease. Drugs are of little use in the treatment, though they may relieve certain symptoms. Fresh air, good food, rest and exercise properly used are of far more value than anything else yet discovered.—*Some Interesting Things About Tuberculosis, S. A. Slater, Med. Rec., January 8, 1921, xcix, 56.*

The Soul of the Consumptive.—We all know something about the physical sufferings of the consumptive, but how many of us fully realize what the consumptive suffers in mind and soul. The well-to-do consumptive suffers because he has failed to do his duty in preventing his employees from be-

coming infected. The rich and poor tuberculous think of saving others even when realizing that they cannot be saved themselves. They worry because they cannot provide for their family, and the conscientious ones harbor a fear that they may give the disease to others in spite of precautions. Phthisiophobia has caused and is causing more suffering to the consumptive than it is possible to imagine. People will not employ even the recovered consumptive and some are afraid to associate with him. A plea is made to let the employer do justice to his employees by periodical examinations for tuberculosis and the provision of proper sanitation for factory, workshop, and store. The worker found to be tuberculous must receive proper and timely treatment. Cities, towns and villages must see to it that there are no insanitary dwellings. An appeal for financial help and encouragement is made.—*The Soul of the Consumptive. A Plea for Justice, S. A. Knopf, N. York M. J., January 1, 1921, cxiii, 24.*

Why Tuberculosis Schemes Fail.—By tuberculosis schemes the author means only such attempts at prevention or treatment as have been sanctioned or adopted by a considerable number of leaders in the antituberculosis campaign. All these have failed because, even in the countries where all or some of them have been in operation for twenty years or more, every tenth or twelfth death is still caused by tuberculosis; because in spite of the functioning of any or all of these schemes, tuberculosis continues to drag its victims from the rank of the rich and the educated as well as from the poor and ignorant; and because, while it must be admitted that these tuberculosis schemes have reduced the tuberculosis death rate, there is very little proof that they have reduced the tuberculosis death rate any more than they have reduced the general death rate. They have simply caused the people to focus their attention on the need of cleanliness—clean air, homes, food, drink, streets, hands, mouths, bodies, barns, cattle and, perhaps, clean lives. As measures for promoting the general health of the community they have been worth while, but as tuberculosis schemes they have been failures. The reasons for the failure of all tuberculosis schemes are the overemphasis given to the value of the activities of the nonmedical antituberculosis workers, the disinclination of most physicians to join heartily in a medical campaign dominated by nonmedical functionaries, the obtuseness of even the medical officers of the tuberculosis campaigns to the importance of the following facts: (1) Aside from its specific toxic power, the most important character of the tubercle bacillus is its waxy, resistant capsule. (2) Serological tests prove that there is a family relationship between tubercle bacilli and all bacilli that possess these waxy capsules. (3) Many ordinary nonacidfast bacteria, when subjected to an unfavorable environment, develop waxy capsules, and thus become demonstrably family relations of the tubercle bacillus. This was known to be true of colon, subtilis, typhosus, mycoides and streptothrix. Measures must be devised that have for their object the securing of such special conditions of person and domicile as prevent the transformation of the digestible or innocent, "thin-skinned" forms of bacterial life into the "hard-shelled," disease producing tubercle bacilli. The theory that all disease producing germs are simply abnormal developments from forms of bacterial life that under ordinary and favorable conditions of environment are harmless or beneficial to human and other animals is formulated. The practical difficulties in connection with the carrying out of tuberculosis schemes are due to the false hypothesis on which they are based, namely, that all tubercle bacilli must of necessity have been born of other tubercle bacilli. As an argument in favor of his contentions Maher cites the history of the following cultures: Avian B, a strain of avian tubercle bacilli, that ten years ago grew entirely acidfast and only at blood temperature, now grows at room temperature and almost entirely nonacidfast. Bovine B, a strain of bovine tubercle bacilli, has a similar history. Red K, sent to Trudeau nearly forty years ago by Koch, now has chromogenic powers, grows at room temperature, is nonpathogenic and almost nonacidfast. R.R.H., an ordinary pathogenic human tubercle bacillus culture, grown for long periods on glycerine potato, first developed chromogenesis, then lost acid resistance and acquired power to grow at room temperature; it now does not cause tuberculosis and on some media loses its bacillary form and becomes coccoid. 512, acidfast bacilli, derived from bacillus subtilis, made acidfast by age and lowered temperature, subjected to the slightly stimulating but difficult environment of normal salt solution and a temperature of 37.4°, do not cause tuberculosis, when injected into guinea pigs intraperitoneally give rise in ten days to small nodules that are not fatal and that disappear in three weeks.—*How "Tuberculosis Schemes" Fail and Why, S. J. Maher, Med. Rec., December 11, 1920, xcviii, 967.*

War and Social Prophylaxis.—Official statistics of the French Ministry of the

Interior gave 83,000 as the annual average of deaths from tuberculosis, while some authorities claimed that the deaths numbered from 120,000 to 150,000 annually. The truth probably lay between these two extremes. The number of men invalided from the army through tuberculosis exceeds 110,000. During the war the Ministry of the Interior organized hospitals called *stations sanitaires* for the treatment of tuberculous soldiers coming from the special army hospitals known as *hôpitaux sanitaires*. The patients were admitted to the *stations sanitaires* prior to being invalided out of the army; and during their stay, the length of which varied, they received sanatorium treatment and education in prophylaxis. On leaving the *stations sanitaires* and returning to their homes, these invalided soldiers were dealt with by a departmental Committee for the Relief of Tuberculous Discharged Soldiers. These district committees, although the result of private, independent initiative, were organized on a uniform plan laid down by the government, and supported and assisted by government authority and subsidies. The activities extended throughout the country, working through the intermediary of delegates or visiting nurses and furnished food, medicines, prophylactic materials and beds to those in need of them. The activities of the district committees were coördinated and facilitated by a National Committee for the Relief of Tuberculous Discharged Soldiers. The achievements of these committees have been considerable. They enable France to undertake an antituberculosis campaign based on sound principles and to provide tuberculous soldiers with adequate assistance and relief. The antituberculosis programme includes the organization of dispensaries, sanatoria, and special hospitals or special sections of hospitals. The dispensary constitutes the actual centre of all antituberculosis organization. The patient is examined there and classified from the medical and the social point of view. The visiting nurse has the opportunity of discovering other centres of infection and of reporting them to the dispensary, which sends the sick either to the sanatorium or hospital. The dispensary is notified when patients are discharged, and undertakes their further care. The sanatoria are reserved for curable cases. They will be more efficient when completed by a social organization of the nature of an employment bureau providing work suitable to this special class of invalid. The tuberculosis hospital is reserved for those cases in which there can be no hope either of a cure or of economic recuperation through work. The isolation of tuberculous cases in the hospitals is considered an imperative duty. The isolation can be carried out in various ways, either by arranging special wards, sections or annexes in the general hospitals. The programme includes the boarding out of children through such societies as the *Oeuvre Grancher*, and an educational propaganda like that carried on formerly by the *Société de Préservation contre la Tuberculose* and today by the Rockefeller Commission and the *Comité National D'Assistance aux Anciens Militaires Tuberculeux*. This programme is in full execution: 200 dispensaries have been established; schools for visiting nurses have been opened; 11 new sanatoria have been organized. The *hôpitaux sanitaires* and *stations sanitaires* will become civilian sanatoria. The tuberculous war invalids, like all disabled and invalided soldiers, are on much the same footing as the rest of the civilian population, and are entitled to the relief and assistance of the institutions established by the civilian authorities. As regards the social prophylaxis of the disease, the antituberculosis organization represents only one link in the chain with which the disease must be hemmed in. It cannot attack tuberculosis at its sources. In order to do that it will be necessary to include the institution of appropriate protective measures, radical changes in housing conditions, a campaign against alcoholism, and the education of children in matters of health.—*The War and the Social Prophylaxis of Tuberculosis, L. Bernard, Internat. J. Pub. Health, November, 1920, i, 281.*

Campaign Against Tuberculosis in Wales.—The North Wales Sanatorium and the South Wales Sanatorium provide 538 beds. Wales and Monmouthshire are divided into 14 dispensary areas, each with a tuberculosis physician. In each area there are a number of visiting stations at which the patients are seen and examined once a week or once in a fortnight. Beds are provided in certain hospitals, at which both pulmonary and nonpulmonary cases are treated. These hospitals are entirely distinct from the sanatoria. Sanatoria have been founded at various centres. The North Wales Sanatorium is near Denbigh, and is for women; the South Wales Sanatorium, Talgarth, is for men. The West Wales Sanatorium at Llanybyther is for women and children; the Penhesgym Sanatorium, Anglesea, is reserved for girls. A farm colony with 50 beds for discharged service men is conducted in connection with the South Wales Sanatorium. An educational campaign is being carried on throughout Wales by means of lectures in all the elementary

and secondary schools. The Council of the Association for Prevention, Treatment and Abolition of Tuberculosis has adopted the principle whereby the Chief Medical Officer becomes the Professor of Tuberculosis at the Welsh National Medical School. A description of the Sanatoria mentioned follows.—*The Campaign Against Tuberculosis in Wales, D. W. Evans, Brit. J. Tuberc., October, 1920, xlv, 166.*

Tuberculosis in Austria.—The Austrian Government has issued, through Dr. S. Rosenfeld, a report on the mortality from tuberculosis during and since the war within the territories of the present republic. In Vienna, 2725 women died of tuberculosis in 1912, and the figure had fallen to 2635 in 1914. There was an increase to 3004 in the first year of the war. The quotas of the four following years are 3543; 4469; 4729; 5018. In England the war was associated with a slight but sensible increase of mortality from tuberculosis among women, which has been attributed to the introduction of large numbers of women to factory work with consequent overstrain. Whereas in England and Wales the rates at most ages for 1919 fell to prewar levels, the Viennese figures for 1919, especially for the ages between thirty five and sixty-five, are worse than those of any former year. The inference drawn by Rosenfeld is that the prime factor has been the progressive deterioration of nutrition, due to economic consequences of the war. The war has thus afforded an experimental proof that the decline in the death rate from tuberculosis prior to it was not a consequence of measures of segregation and of prevention of infection, but was dependent upon a general amelioration of economic conditions leading to the attainment of a better standard of nutrition. There is a lack of agreement respecting the fundamentals of etiology amongst competent students of the tuberculosis question. The dispute is not of mere theoretical interest; its settlement would gravely affect administration. The most hopeful feature is the better temper in which the discussion is conducted. The value of different lines of research is more generally realized, and this will perhaps lead to the discovery of great truths.—*Tuberculosis in Austria, Leading Article, Brit. M. J., November 27, 1920, 829.*

Causes of Death in United States Registration Area, 1919.—The Census Bureau's annual bulletin on mortality statistics for the registration area in Continental U. S. shows 1,096,436 deaths as having occurred in 1919. This represents a rate of 12.9 per 1000 population and is the lowest rate recorded in any year since the establishment of the registration area. The rate for 1919 is in striking contrast with the unusually high rate for 1918, the year of the pandemic of influenza, which was 18 per 1000. There was therefore a drop of 5.1 per 1000. The death registration area comprised 33 states, the District of Columbia, and 18 registration cities in nonregistration states, with a total estimated population of 85,147,822 or 81.1 per cent of the estimated population of the U. S. Of the 1,096,436 deaths, organic disease of the heart was the most frequent cause of death, the number being 111,579. Tuberculosis (all forms) was next frequent, with 106,985 deaths, or 125.6 per 100,000 population, or 9.8 per cent of the total. There were 94,772 deaths from tuberculosis of the lungs, or 111.3 per 100,000 population; 5,175 deaths from tuberculous meningitis, or 6.1 per 100,000 population, and 7038 deaths from other forms of tuberculosis.—*Principal Causes of Death in United States Registration Area, 1919, Pub. Health Rep., xxxv, November 19, 1920, 2787.*

Public Health Service Forced to Transfer Tuberculosis Patients to the East.—All the hospitals and contract hospitals of the United States Public Health Service in the semi-arid southwest are already crowded with tuberculosis patients and the influx of others from the eastern states continues so great that the Public Health Service has been forced to transfer patients from Tucson, Ariz., and other western hospitals to sanatoriums near Asheville, N. C., and elsewhere in the east. Many ill-advised patients have of late thronged to Tucson, unmindful of the fact that every hospital bed in that place is filled and every hotel and boarding house overcrowded. More than 500 tuberculosis subjects in Tucson are unable to find entrance to a sanatorium. Other towns in the southwest report similar conditions. Surgeon General Cumming again renews his warning against tuberculosis patients leaving sections where the government is able and willing to care for them and going to the southwest on their own initiative.—*Bull. Pub. Health Service, January, 1921.*

Deaths and Death Rates from Pulmonary Tuberculosis in New York City and State.—The following tables, showing the deaths and death rates from pulmonary tuberculosis for New York City and State, for October and November, during the years 1913 to 1920, inclusive, are taken from the *Monthly Vital Statistics Review, New York State Department of Health, December, 1920, and January, 1921, New Series, vol. i, nos. 10 and 11.*

Pulmonary tuberculosis: Deaths and death rates, New York State and large subdivisions, October, 1913, to 1920*

MONTH	YEAR	NEW YORK STATE		NEW YORK CITY		REST OF STATE							
						Total		Urban		Rural		Institutional Districts	
		Number	Rate	Number	Rate	Number	Rate	Number	Rate	Number	Rate	Number	Rate
October average	1913–17	1,057	123.1	647	139.3	410	104.0	203	106.1	207	102.0		
October	1913	1,040	125.8	604	136.8	436	113.4	224	119.7	212	108.0		
October	1914	1,021	121.2	646	143.0	375	96.6	205	107.3	170	86.4		
October	1915	1,100	128.0	692	149.0	408	103.5	188	98.3	220	108.4		
October	1916	1,034	118.5	633	133.3	401	100.8	197	101.7	204	99.9		
October	1917	1,089	122.2	662	136.2	427	106.0	199	101.0	228	110.3		
October	1918	1,520	168.0	851	171.0	669	164.1	287	143.0	316	152.1	66	
October	1919	813	88.0	481	94.5	332	80.5	144	70.5	159	76.1	29	
October	1920	726	77.5	408	78.4	318	76.2	129	62.4	155	73.7	34	

* Deaths per 100,000 population per annum.

Pulmonary tuberculosis: Deaths and death rates, New York State and large subdivisions, November, 1913, to 1920*

MONTH	YEAR	NEW YORK STATE		NEW YORK CITY		REST OF STATE							
						Total		Urban		Rural		Institutional Districts	
		Number	Rate	Number	Rate	Number	Rate	Number	Rate	Number	Rate	Number	Rate
November average	1913–17	1,066	128.2	670	149.1	396	103.8	201	108.6	195	99.3		
November	1913	1,060	132.6	642	150.2	418	112.3	199	109.9	219	115.3		
November	1914	1,034	126.8	690	157.8	344	91.5	177	95.7	167	87.7		
November	1915	1,092	131.4	673	149.7	419	109.9	227	122.7	192	97.8		
November	1916	1,071	126.8	686	149.3	385	100.0	201	107.2	184	93.1		
November	1917	1,074	124.6	659	140.1	415	106.5	202	106.0	213	106.5		
November	1918	1,230	140.5	727	151.1	503	127.6	210	108.2	241	119.8	52	
November	1919	784	88.0	452	91.8	332	83.2	116	58.8	171	84.8	45	
November	1920	756	83.3	440	87.4	316	78.3	142	71.0	147	72.2	27	

* Deaths per 100,000 population per annum.

Low Tuberculosis Death Rate for November, 1920.—The death rate during November continued exceedingly low, although a very slight increase is in evidence as compared with October. The general health situation over the country remains favorable. The outstanding feature in the health record of the month is the remarkably low rate for tuberculosis, namely, 109.7 per 100,000 exposed. This marks a new minimum for this disease in the experience of the Industrial Department of this Company (Metropolitan Life Insurance Co.). The lowest figure for any prior month was that for September of this year—111.3 per 100,000.—*Statistical Bulletin, Metropolitan Life Insurance Co., December, 1920, vol. i, no. 12, p. 8.*

Vital Statistics for the Year 1920 in New York City.—The year just closed has established a record as the healthiest year that the city has ever experienced at any time in its history. There were 73,249 deaths reported and a death rate of 11.93 per 1000 of the population, as compared with 74,433 deaths and a rate of 12.39 for the year 1919—a decrease in the absolute number of deaths of 1184, and in the death rate of 0.46 of a point, which is equivalent to a saving of 2824 lives, taking into consideration the increase in the population during the year 1920, as compared with 1919. Three prominent features of the year's mortality from individual causes stand out as indicative of improved health conditions. First and foremost, the mortality from pulmonary tuberculosis and other forms of tuberculosis. During the year, there were 6164 deaths reported from tuberculosis of the lungs, with a death rate of 1 per 1000 of the population, as compared with 7395 deaths and a rate of 1.23 in 1919—a decrease of 1231 deaths and 0.23 of a point in the rate, which, if the increase in the population be taken into consideration, means a saving of 1412 lives. From other forms of tuberculosis, there were 970 deaths reported during the year, as compared with 1103 deaths in 1919—a decrease of 133 deaths, equivalent to a relative decrease of 246 deaths, so that all told the mortality from tuberculosis showed a decrease of 1657 deaths. The most important factors in causing this decreased mortality from tuberculosis are three in number: First.—The increased amount of money received by each family as wages, with the result that a greater quantity of nutritious food was obtainable by people prone to tuberculosis. Second.—The greater opportunity for relaxation, open-air exercises, and social enjoyment. Third.—The increase in the spread of knowledge of this cause of death and sickness. This decrease in the mortality from tuberculosis is by no means a local manifestation, as the same improvement in the death rate from this cause is noted in all of the large cities of the country.—*Weekly Bull., Dept. of Health, N. Y. City, January 8, 1921, x, 11.*

Statistics of Tuberculosis Institutions.—At the first meeting of the Society of Superintendents of Tuberculosis Institutions, a committee of three was formed to inquire into the possibilities of the coördination of statistics of such institutions. The following article is based on this inquiry. From the results the author finds that there is a great need for coördination. He has attempted to give a basis for the coördination of statistics of tuberculosis institutions. There must be secured uniformity in clinical classification, in describing immediate results and after-results of treatment, in the registration of all cases treated, and a uniform case sheet and method of symbolic representation of physical signs. There are four main factors which have an influence on prognosis, and therefore on classification. All previous methods were based on one to three of these factors and were thus defective in the omission of one or more factors. The suggestion offered is to classify all four factors in degree independent of each other. (1) The extent of the lesion: L_1 = involvement of one lobe or less. L_2 = involvement of 1–2 lobes. L_3 = involvement of 2–3 or more lobes. L_4 = multiple lesions (e.g., larynx or intestines involved). (2) The type of the lesion: The four stages of chronic lung tubercle are: (i) Infiltration = T_1, fine crepitations and slight dulness. (ii) Consolidation = T_2, dulness extensive with bronchial breathing. (iii) Excavation = T_3, vomica formation or extensive breaking down. (iv) Fibrosis = T_4, fibrous changes. (3) Systemic effect: Pyrexia, tachycardia, night sweats, emaciation, anemia, nervous symptoms, hemoptysis, and anorexia. The grades are: S, no systemic effects present. S_1, where some of the systemic effects are present but none severe. S_2, where all eight are present or one very severe. (4) Sputum as to presence of tubercle bacilli: Four degrees T. B. 0, T.B. +1, T.B. +2, T.B. +3. The returns from 33 sanatoriums disclosed 24 different methods of describing immediate results. The following terms should be used in regard to systemic effects. MI = Systemic effects disappeared. I = Systemic effects lessened. I S Q = Systemic effects unaffected. W = Systemic effects worse. D = died. The condition of the sputum as to

tubercle bacilli must be reckoned with. (1) Bacilli absent on admission and on discharge = T.B. 0 K. (2) Present on admission and on discharge = T.B. +K. (3) Present on admission and absent on discharge = T.B. + 0. (4) Absent on admission and present on discharge = T.B. 0 +. About half of the sanatoriums kept statistics of late results. These are more important than the immediate results. Therefore such statistics should be compulsory. The usual classification used is full work, partial work, no work, died, lost sight of. As to uniform case sheets, the author had sent to him the case sheets of over 30 sanatoriums and scarcely any one was the same as any other. Some were overcrowded with details; others had too few. Those that give state on admission in full details along with a summary of the state on discharge as compared with the state on admission are to be preferred. A standard case sheet is included in the report. All sanatoriums should have a bound register giving the main facts of each case. An attempt should be made to get unanimity in the symbolic representations of physical signs. A scheme for the symbols to be used is included in the report. —*Coördination of Statistics of Tuberculosis Institutions, N. Robertson, Tubercle, December*, 1920, *ii*, 97.

Etiologic Factors in Pulmonary Tuberculosis.—That the tubercle bacillus is the direct cause is indisputable, but from this fact as a starting point the path deviates and leads to an interminable maze of individual opinion. The important major premise that all pulmonary tuberculosis has its origin in infancy and childhood, and the minor premise that the human type of bacillus is responsible for the bulk of the infections, must, in the light of past experiment and present knowledge, be accepted. Tuberculous adenitis, the precursor of adult pulmonary tuberculosis, is the primary infection. Adult pulmonary tuberculosis, or the secondary manifestation of the tuberculous infection, is in the nature of a metastatic process. There are two essential requisites for a beginning pulmonary tuberculosis: the primary infection of childhood, plus the fertile soil, the lowered resistance, the predisposition. The occurrence of intrauterine infection, the transmission of the disease from the father or the mother through heredity and the occurrence of congenital tuberculosis have not been proved. The child of a father or mother, who is actively tuberculous at the time of its birth, is handicapped and influenced in two ways. It is deprived of an eugenic start in life, and is subjected from its earliest infancy to infection through direct contact, especially if the affected parent be the mother. Any condition or disease which impairs, locally and permanently, the respiratory tract, especially the lung or pleura, is a predisposing factor to pulmonary tuberculosis. Primary pleurisy with effusion is synonymous with tuberculous pleuritis. The focus of infection in such pleurisies may be located in the parietal pleura, but in the vast majority of cases it is of pulmonary origin. Dry pleurisy is of tuberculous origin in a heavy percentage of cases, provided it be a true pleurisy. After examining and following up more than 500 cases of measles, the conclusion was reached that this disease deserves no important place among the predisposing factors. Of the 500 cases examined, only one gave conclusive proof of reactivation directly attributable to measles infection. A study made during the influenza epidemic of 1919 on more than 30 cases of quiescent and healed pulmonary tuberculosis revealed reactivation of 13 cases directly attributable to influenza, i.e., over 40 per cent. The importance of the various occupations has been generally overestimated. The following practical points should be observed: (1) An infant of an actively tuberculous parent should be guarded as early and as thoroughly as possible, even if it entails the separation of the infant from the parent. (2) At the age of four or five years, all suspected glandular patients should be carefully examined and checked with X-ray examinations and Pirquet tests. If a positive diagnosis is arrived at, such a child must be treated sanely but vigorously. It is as essential to enforce absolute rest on a tuberculous infant and child, with an active lesion, as it is in the adult. The exact mechanism of immunity is far from being clear, but we know that rest is the greatest synergist of passive immunization. Ten days to two weeks in the average case is probably sufficient. (3) All school children at the age of seven years, or at least all suspicious cases should be given Pirquet tests and, if positive, a thorough course of protective treatment. (4) Children who have had glandular infections should be closely watched and followed into adult life. As adults they should be dealt with frankly and warned that pernicious habits such as excessive smoking, excessive venery, venereal disease, etc., may light up the smoldering ember and result in an active pulmonary tuberculosis.—*A Consideration of Etiologic Factors in Pulmonary Tuberculosis, R. S. Berghoff, Annals of Med., July, 1920, i, 276.*

Relation of Contact to Development of Tuberculosis.—Experimental evidence has

shown that such objects as gauze used to cover the mouth when coughing, pillow cases used twenty-four hours, patients' hands, spoons used by patients, magazine covers picked up indiscriminately from the wards, and door-knobs frequently handled by patients are contaminated with living, virulent tubercle bacilli. Patients with open tuberculosis frequently emit infectious particles when coughing. If these particles are collected 15 inches from the mouth of the patients, 35 per cent of a group of guinea pigs can be infected; if collected at a distance of 6 inches, the percentage increases to 75 per cent. Such particles, no doubt, are inhaled by persons in close proximity to the patients. The saliva in open cases of tuberculosis usually contains living tubercle bacilli. The sedimented urine in twenty open pulmonary tuberculosis cases negative for genitourinary tuberculosis failed to infect any of the twenty inoculated guinea pigs. Out of 240 nurses employed at the Cincinnati Tuberculosis Sanatorium, only three developed tuberculosis, and one diagnosed as tuberculous after working at the sanatorium for two years gave a history of previous infection.

Aside from the mere presence of the organism in the body, other factors are necessary for the development of clinical tuberculosis. What the factors are has not as yet been clearly shown. In all probability there must be a lowering of the individual resisting power; whether this is congenital or acquired, whether purely local or constitutional, resulting from pathologic states or physical abnormalities, is still a question. At all events, we may safely assume that the elimination of clinical tuberculosis from adults will largely depend on the establishment of such living conditions as will keep up to normal those powers of individual resistance.—*Relation of Contact with Tubercle Bacillus to Development of Tuberculosis in Adults, J. B. Rogers, J. Am. M. Ass., December 18, 1920, lxxv, 1690.*

Is Tuberculosis Contagious?—Ghon and Hamburger have shown in numerous autopsies that the human bacillus enters the system through the lung. In the larger cities Pirquet tests, X-ray and physical examinations, show that 90 per cent of children under 14 years are infected; in rural communities, it may be as low as 25 per cent. It is believed that these infected people cannot receive a secondary infection. The logical conclusion must be that tuberculosis is primarily a disease of the lymph nodes, a disease of childhood, that once a person becomes infected he will remain so as long as he lives, to give tangible expression of such infection by the invasion of the lung if conditions occur which will bring the bacilli out of the lymphatics into the blood stream. Laennec was one of the first to announce that tuberculosis of the lung is not contagious from man to man, that the danger of contagion is largely with children. Wilson Fox found but two instances of married couples infecting each other in over 27 years experience. Weber, West and Osler found a similar paucity of instances of contagion between man and wife and between the invalid and the attending nurse. Tuberculosis is positively contagious to every child, and generally produces an infection. In the tuberculosis clinics of Jersey City no Pirquet negative or X-ray negative case in the adult, whether nurse, attendant, or physician working in tuberculosis institutions, has ever come down with an active process in the lung in the author's experience. All of the attendants are given careful examinations before employment. A number of them show infection; many of them show healed lesions; a large percentage are in a position to "explode" on provocation. These are the ones which the general profession say "caught it."—*Is Tuberculosis Contagious? G. K. Dickinson, Med. Rec., December 4, 1920, xcviii, 943.*

Diseased Tonsils and Pulmonary Tuberculosis.—In a series of cases referred for nose and throat examination during the past six years, it was observed that practically every case gave a history of recurrent inflammation of the tonsils, at some time or other, and upon examination the crypts were found to be filled with deposits of thickened pus. Some cases gave no history of a tonsillar inflammation, but the tonsils were found similarly diseased. In the army the author had the opportunity of doing practically all the nose and throat work for approximately 28,000 men and found not a single case of tuberculous infection which did not give a history of tonsillar involvement associated with it. Men sent into the hospital with symptoms of an incipient pulmonary tuberculosis were referred for a nose and throat examination; these consistently revealed diseased tonsils. In a number of cases tonsillectomy was advised and performed as an adjunct to the treatment of the pulmonary condition. In the larger proportion of cases thus treated, beneficial results were obtained. Men were frequently returned to active duty, who otherwise would have been sent to the rear. The removal of the tonsils in pulmonary tuberculosis is advanced as a theory only, unsustained as yet by laboratory and clinical findings. It is maintained, however,

that there is a distinct relationship between tonsils and pulmonary tuberculosis, and that markedly beneficial results are obtained by tonsillectomy when performed during the initial stage of the disease.—*The Relationship Between Diseased Tonsils and Pulmonary Tuberculosis, W. L. Rhodes, N. York M. J., December 4, 1920, cxii, 902.*

Infants of Tuberculous Mothers.—Bernard and Debré conclude from 123 cases that the infant of a tuberculous mother does not inevitably contract the disease at once; some were saved even after from eight days to three months of contact with the tuberculous mother. None of the infants failed to contract the disease with over six months of contact. The contaminated infants almost all died within a month after being taken from the mother, even those that seemed healthy at first. Hence if the infant taken from a tuberculous mother outlives the second month, there is reason to hope that it will survive, but only a series of negative tuberculin skin reactions will confirm that the child is sound. They commend boarding out these infants in country families. Only 18 children survived of the 58 who were cared for by mothers with bacilli in the sputum, but 57 survived from the 65 mothers with "closed" tuberculosis.—*Les modes d'infection et les modes de préservation de la tuberculose chez les enfants au premier âge, L. Bernard & R. Debré, Bull. d. l'Acad. d. Med., October 5, 1920, lxxxiv, 86.*

Pulmonary Tuberculosis in Childhood.—Ghon's primary focus in the lungs with secondary infection in the bronchial glands afforded a sure anatomic pathological basis for clinical investigation. The tendency towards healing of the usually small primary tuberculous infection explains the positive tuberculin reaction in spite of negative lung findings. The value of the X-ray in the recognition of latent hilum glands and lung foci especially in children cannot be doubted. The key to the understanding of the conflicting views in regard to tuberculin therapy is the lack of a uniform classification. Theoretically it is possible to realize the structural processes in the diseased tissues and to ascertain the applicability of a specific therapy by means of the diagnostic biologic reaction with Deycke-Much's partial antigens. The clinical classification of pulmonary tuberculosis according to anatomic pathologic processes is indispensable for the indication and prognosis of the pneumothorax therapy. Its success and failure stand in close relation to the anatomic character of the disease. The present collapse therapy lacks objectivity and does not consider the anatomic pathology. The occurrence of pleural exudation during pneumothorax therapy has caused reluctance in employing this treatment. The pneumothorax exudate is not always undesirable, as it causes increased compression of the lung and has a favorable serological immunizing influence. The frequency of its occurrence stands in direct relation to the degree of involvement of the pleura. But if the exudate becomes purulent this signifies a serious progressing tuberculosis. In that case the pleura reacts to the increased stimulus of the pneumothorax with greater activity and exacerbation. The differentiation of the shadows in roentgenograms of the lung caused many difficulties at first. A collection of 33 characteristic roentgen ray pictures of pulmonary tuberculosis in childhood with the clinical histories is incorporated in the book. They prove how conclusive the X-ray picture is for an early diagnosis. The sooner the early stages are recognized in childhood and the sooner treatment in institutions is possible, the sooner tuberculosis as a public plague will be controlled. Whereas in the adult the appearance of a spontaneous pneumothorax is connected with a cavernous process, there appears to be a different etiology in the young child and infant. Langstein and Ypo state that pneumothorax occurs more frequently in the young child than is commonly believed. The most frequent causes are small non-tuberculosis abscesses with rupture into the pleural cavity and following empyema. In the 100 cases of tuberculosis observed by Harms since 1912, there were 2 cases of spontaneous pneumothorax diagnosed and confirmed by autopsy. There is also a paucity of statistics on artificial pneumothorax. While the importance of tuberculosis in childhood is recognized by science, daily practice has not yet conceived and utilized it. The diagnostic difficulties lie in the absence of sputum, in remissions lasting months to years, in the afebrile course of even active tuberculosis, and in the possibility of gain in weight in spite of progressing tuberculosis. The tuberculin reaction while indicating the infection proves nothing about the activity or inactivity of the process, except in earliest infancy. The fight for early diagnosis and treatment must be carried on with the aid of the school physicians, infant welfare and welfare stations for the tuberculous. Systematic pneumothorax treatment was first used in the Strassburg clinic. Of the 10 cases reported, 6 were tuberculous, 4 chronic bronchiectasis. In 4 of the 6 cases the temperature became normal and the general condition improved, the longest period of observation being nine

months. Pneumothorax treatment will show good results in childhood as soon as it is understood that the course of childhood tuberculosis in general is less favorable. Of the 100 cases observed by Harms in the welfare station or city hospital in Mannheim, Germany, the sputum was positive in 65. In the others positive diagnosis was made on physical and X-ray findings. Of the 65 open cases two-thirds were girls. This relative frequency in girls has been observed by others without an adequate explanation so far. Twenty-one cases were selected for pneumothorax treatment because the process was unilateral. The most frequent forms besides the miliary, were the infiltrating, the nodular and the pneumonic, all originating in the hilum region. The prognosis depends on the predominance of fibrous or exudative changes. Any form may be accompanied by cavity formation. The therapeutic effect of pneumothorax lies in the abatement of toxic symptoms and improvement of the general condition. The author's 160 observations make him consider pneumothorax a marked progress in the therapy of advanced cases. Forty-six case histories with roentgen photographs before and after pneumothorax treatment are incorporated in the book. The following rules for pneumothorax treatment in childhood are formulated: (1) The symptomatic effect is the same in adults and in children. (2) Treatment must be started earlier in children because they give a less favorable prognosis. (3) The latter, like in the adult, is dependent not only on the extent, but on the anatomic pathologic character of the disease. The fibrotic are the most favorable, the pneumonic ulcerative processes the least favorable. (4) In the fibrotic process clinical and anatomical cure may be expected, in the ulcerative only symptomatic success. (5) The duration of the treatment also depends on the anatomic basis of the disease; benign processes may heal in a period of one to two years. Gradual expansion of the lung must be watched with the X-ray. Ulcerative processes must remain under compression for several years, depending on the extent. (6) Too early expansion of the diseased lung must be avoided. (7) Serous and purulent exudates are unfavorable complications of pneumothorax treatment in the more malignant forms. (8) There are no technical difficulties peculiar to childhood, but in unmanageable children a short anesthetic may be necessary during the filling.—*Beiträge zur Lungentuberkulose im Kindesalter. (Die kindliche Lungentuberkulose im Röntgenbilde, Klare. Die Pneumothoraxtherapie der kindlichen Lungentuberkulose, Harms), Leipzig, Verlag von Curt Kabitzsch, 1920.*

Chronic Gas Poisoning and Pulmonary Tuberculosis.—The cases reported were studied by the author in United States General Hospital No. 21 (Denver), and as medical consultant to the United States Public Health Service, Duluth. The patients were men from 18 to 40 years, physically fit, who had not had influenza, pneumonia, typhoid fever or any of the acute exanthemata and whose past medical history was negative as to tuberculosis. The various kinds of gases used in the war were mustard gas, phosgene and the chlorine gases. Primarily they produce congestion, edema, ulceration and later secondary infection of the skin and all the mucous membranes with which they come in contact. The greatest damage is done to the respiratory tract. Here they produce congestion, edema, and ulceration of the bronchial mucous membrane and the inflammation spreads to the surrounding tissue, the parenchyma and the supporting framework of the lung. Sloughing and hemorrhages may occur. If the gassing has not been severe enough to cause death by asphyxiation and cardiac failure, nature begins to repair and scar tissue is formed. This condition makes a very fertile field for the growth of the tubercle bacillus and the gas as a poisonous product breaks down immunity in a sufficient degree to allow the lighting up of any old foci that may have been present. The chronic symptoms of gas poisoning do not always depend upon the severity of the poisoning. The symptoms in the order of their frequency are shortness of breath, especially on slight exertion or paroxysmal in character, weakness and early fatigue, cough, with or without expectoration, paroxysmal, occurring at various times during the day or night, pain in various parts of the chest, nausea and vomiting, poor appetite, epigastric pain after meals, constipation or diarrhea, loss of weight, hoarseness which may be intermittent, tachycardia, which may be paroxysmal, easily irritated eyes, tendency to catch cold easily, profuse perspiration and pleurisy. The writer has recently diagnosed a number of cases of tuberculosis two years after the gassing. These individuals have been examined at various times in the past two years, and heretofore a diagnosis of tuberculosis had not been made. This shows the baneful effect of the gas and it shows that it has taken two years for the old lesion to become reactivated or a new infection to become implanted. The physical examination of moderately severe cases of gas poisoning may reveal the following: diminished expansion, rarely of the entire chest, most frequently of the bases, one or both, more often the right, less frequently the upper regions; tactile fremitus increased;

depressions above and below the clavicles; respiration shallow; impaired resonance; percussion normal or even hyperresonant; inspiration rough, harsh and sometimes of the cogwheel type. In some expiration is prolonged. Over the bronchial areas the breathing is almost tubular. The râles are scattered, but are more prominent in the middle of the chest; they are of every character, come and go, and usually clear up on coughing. When the patient expires, coughs and inspires, the râles do not come at the beginning of inspiration as the tuberculosis râle does, but later during and extend through inspiration. They resemble sibilant and sonorous râles. The underlying pathological condition consists of a true inflammation of the bronchi, with some old peribronchial induration that is contracting the bronchus from the outside and infiltrating the interstitial tissue of the lung. There is also a turgescence of the mucous membrane. The pulse is usually rapid, 80 to 100. Blood pressure is normal or lowered. Stereoplates show around the bronchi and vessels more or less pronounced haziness extending far out into the lung substance. The differential diagnosis between pulmonary tuberculosis and chronic gas poisoning of the lungs is often extremely difficult. As time goes on more and more of these cases, in which a definite etiology of gas can be proved, will be found.—*The Relation of Chronic Gas Poisoning (Warfare) of the Lungs to Pulmonary Tuberculosis, F. W. Spicer, Minn. Med., December, 1920, iii, 573.*

Influenza and Tuberculosis. — The much-vexed questions of the effect of influenza on the incidence of tuberculosis and its effect upon frank, active cases, are considered, numerous authorities in this country and Europe being cited. According to Fishberg tuberculous patients have shown a relative insusceptibility to influenza, and when acquired the latter failed to hasten the progress of the tuberculosis. Amberson and Peters have taken exception to this, emphasizing the great variability in incidence of influenza among comparable, supposedly normal groups. They grant that no increase in tuberculosis mortality has occurred in recent months, but believe, like Leichtenstern in 1890, that many severe cases of tuberculosis were terminated rapidly during the height of the 1918 and 1920 epidemics, with a corresponding subsequent lull, while new cases came on. Debré and Jacquet believe that on the whole tuberculous individuals were less heavily attacked than nontuberculous groups, but abandon the common explanations that this immunity was due either to the better hygienic surroundings and prompt care of the tuberculous patient, or to a true immunity against acute respiratory diseases conferred by the chronic process. They believe that the acute process does not seriously influence an open case of tuberculosis, but curiously enough may flare up a previously dormant one. Armstrong in Framingham believed in a relative protection for the tuberculous, either because they were better educated in hygiene, or because the preëxisting infection was responsible for an actual defense against new invaders. On the other hand he too found a lighting up of hitherto unrecognized cases. W. T. Vaughan in his own experience finds that in a moderately large number of cases a preëxisting tuberculosis was tremendously fired by an attack of influenza, the latter apparently being like measles, one of the diseases of anergy. His conclusions on the subject are as follows: Great variation in the interaction of influenza and tuberculosis must be expected, because of the many stages at which the tuberculous may be attacked, because of the altered mode of living of known consumptives, and because of the protected life of most of them. Phthisical patients as a group are relatively insusceptible to influenza infection. This may be due to the tuberculous process itself or to some extrinsic but closely related cause. But many individuals with pulmonary tuberculosis do get influenza, and the disease having been contracted in many cases hastens the fatal termination of the tuberculous process. It may be that this phthisical exacerbation occurs more frequently in individuals with latent tuberculosis, individuals who are not at the same time mobilizing their protective antibodies.—*Influenza and Tuberculosis, Editorial, J. Lab. & Clin. Med., November 1920, vi, 105.*

Pregnancy in Tuberculosis.—Tuberculosis in itself does not disqualify the male or female for reproduction. The experience of the human race proves this. Tuberculosis has prevailed among civilized people as long as there are records of man's activity on earth. It was much more prevalent in the older civilizations than in our own. If it disqualified men and women for reproduction, the human family would have become extinct long ago. Occasionally the female becomes pregnant when the disease is advanced, and now and then a male who has extensive tuberculosis is capable of procreating, especially if the disease has been arrested even temporarily. Ordinarily the children of tuberculous parents come into the world well formed, well developed, and in good health and, if protected against implantation, grow up into strong adults.

Pregnancy does not shorten the life of a tuberculous woman. On the contrary, if proper advantage is taken of it, it may prolong life. In the organism of a pregnant being all functions are first for the welfare of the new being, and next for the welfare of the parent. So intense, however, is the interest of the organism in the new being that with proper direction, it can be made to work also for the parent. In pregnancy desire for food and capacity to change food into tissue increases, especially after the third month, and, if in health, the pregnant woman not only makes the tissues for the new being, but stores up some for herself. When a pregnant woman has tuberculosis her desire for food increases, but her capacity for changing the food into tissue may have been lessened by the injury which has been done to her lymphatic system, to her lungs and alimentary canal. By putting her organism in the best condition possible for physiological action, by putting her body at rest so as to cut down the consumption of energy to the lowest point, and by selecting her food so as to get the largest return in healthy blood cells with the smallest consumption of energy in making them, her capacity for changing food into tissue can be brought up to her desire for food, and thus make her pregnancy a means of recovery for her, In itself, pregnancy does not hasten the progress of tuberculosis. This has been proved by experiments on animals. Pregnant animals which have been injected with tubercle bacilli have lived as long as nonpregnant ones. The only handicap which comes to a pregnant being in its struggle against tuberculosis is in the injury which the disease may have done to that part of the organism which has to do with nutrition and this can be overcome with treatment. The innocuous influence of pregnancy on tuberculosis is strikingly shown by the mortality statistics from tuberculosis in all civilized communities at the present day. The death rate from tuberculosis is very much lower in the female than in the male, and yet the child bearing years have the highest mortality from the disease. There may be accidents of pregnancy which can bring about recrudescence in dormant tuberculosis. It occasionally happens that within six or eight weeks after parturition a tuberculous process which has been quiescent for a long time becomes active and runs a virulent course. The author is convinced that the recrudescence is due most frequently to mild sepsis, occasionally to subinvolution, and now and then to the giving of ether. These are accidents which can be avoided. It might be well to mitigate the severity of labor in tuberculous women by the use of gas and oxygen or a little chloroform, which do not seem to be contraindicated in tuberculosis. Contraceptive practices, except continence, and abortion in all probability are more conducive to activity in tuberculosis than pregnancy. Metabolism plays an important rôle in the fight against tuberculosis, and the mental distress and irritation, which accompany and follow unnatural contraceptive acts seriously disturb metabolism. Abortions are a much more fruitful cause of recrudescence than parturition. There are reasons why individuals who are advanced in tuberculosis or who have the disease in an active form should not get married, but the reasons are not predicated upon procreation or upon pregnancy. A person who has been seriously injured by tuberculosis, when restored to good physical health, must live a careful, easy life to remain well. The worry and hardships of married life, which may come to people of moderate means are conducive to recrudescence and activity as long as living tubercle bacilli remain in the body. The advisability of marriage for tuberculous individuals depends upon whether the disease is dormant or active, how far it has progressed, whether the conditions of life in the married state will be more conducive to physical well-being and to happiness than in the single state and a willingness of the healthy party to the marriage contract to enter upon the contract with a full and complete knowledge of the condition of the tuberculous party and a readiness to make whatever sacrifice may be necessary in consequence of it. A person with active tuberculosis should not get married. An exception may be made when the conditions for recovery would be definitely improved by the change in the social state. A person with open ulcerative tuberculosis should be cautious about getting married. When it can be foreseen that nothing in the married state can interfere with physical well-being and happiness it is safe to get married. The prospective consort should be fully informed of the condition of the patient and of the danger to himself and any child which may be born. A person who has recovered from tuberculosis without having had open ulcers is free to get married without restriction of any kind. A tuberculous woman should be carefully watched and scientifically treated during the entire period of pregnancy and for at least six months after parturition. If the disease is at all active she should be kept at complete rest in bed. The diet must be nutritious, easily digested and easily assimilable. Her emunctories should be kept active. The weight of evidence is against the idea that the tubercle bacillus

can be transmitted to the offspring through the milk. There is a definite benefit to the mother in nursing the child for at least six weeks after parturition, because this aids involution of the uterus. After six weeks the child may be weaned to save the drain upon the mother.—*Pregnancy in Tuberculosis, L. F. Flick, Hospital Progress, 1920, i, no. 7.*

Nontuberculous Lung Changes Following Pneumonia.—The great prevalence of pneumonia during recent years, more especially during the pandemic of influenza, and its prominent rôle in the disease of our soldiers, has caused a notable increase of the incidence of this disease among the people. In view of these facts, it should be borne in mind that during the next few years a great many chronic nontuberculous lung changes will be encountered. Their recognition is important because of their similarity to pulmonary tuberculosis, and their confusion with it.—*Nontuberculous Lung Changes Following Pneumonia, E. N. Packard, J. Am. M. Ass., December 4, 1920, lxxv,* 1537.

Prophylaxis in Tuberculosis.—Bacillary infection is compatible in the great majority of the human and bovine species with every appearance of health. Koch's bacillus usually remains a harmless parasite. Massive infections alone, occurring in children or adults free from any previous infection, result at once in a local or general disease of the lymphatic system. The most usual types of this disease are: (1) The acute miliary, nearly always rapidly fatal. (2) The bacillary septicemic, of which the gravity is in direct relation to the origin, virulence and number of the infecting microbes. (3) Benign infections which after remaining for many years occult or latent produce specific resistance to a new infection. When the latter is superimposed, it provokes Koch's phenomenon. The infected organism then tends to drive the bacilli to the surface, forming abscesses in which caseation takes place. The resulting forms of tuberculosis usually evolve slowly. They present a most serious danger through the diffusion of infectious material. This is favored by travel and commerce, the crowding of people into towns, bad ventilation and insufficient sunlight, and ignorance of evading contagion. These sowers of germs and the germs they sow are so numerous that 55 per cent of townbred children are already contaminated at the age of five years, and that after the fifteenth year scarcely 5 per cent of the total population remains completely free. The defensive reactions with which the organism opposes infection vary with different individuals. Age, integrity of lymphatic organs, the condition of the heart, vessels, lungs, liver, kidney, skin, the modality of nutrition and respiratory exchange play a rôle in every case. Everyone combats infection with natural arms: leucocytes, lymphatic glands, cellular ferments, hereditary or acquired powers of resistance or of intolerance towards the bacillus, The improvement of the material conditions of living, compulsory insurance laws, increased wages for the workers and the abolition of alcoholism will limit the possibility of contagion. But antituberculosis action can only be truly effective when individuals and communities are guarded against bacilliary infections and especially reinfections which give rise to grave and contagious forms of tuberculosis. Those who react positively to tuberculin, although they may appear perfectly healthy, intermittently eliminate and distribute virulent tubercle bacilli. Because of this intermittent feature they are very difficult to find. Every healthy individual who gives a positive reaction to tuberculin ought to be considered as suspect. Young children and young animals must be prevented from drinking unsafe milk which has not been heated at least 30 minutes at 70°C., or 15 minutes at 80°C. Contamination of food by bacilli from dejecta must be avoided. It results not only through unclean hands, soiled linen, contaminated vegetables and fruits, but also through the medium of flies and by soil or dust coming from fields which have been manured. Vaccination of all men and animals who are tuberculizable is the only means of limiting tuberculous infection and ultimately extinguishing it. It is a practical possibility since it is effected spontaneously in an immense number of individuals. Undoubtedly it would be dangerous to provoke such infections artificially by the use of virulent tubercle bacilli. But it is possible to modify certain properties of these bacilli in such a way that they become incapable of producing those cellular changes characteristic of tubercle.—*Prophylaxis in Tuberculosis, A. Calmette, Tubercle, November, 1920, ii, 49.*

The Bovine Bacillus and Man.—The diversity of views expressed in the correspondence on tuberculous milk shows that much work remains to be done, in comparative medicine and pathology, before a final decision can be reached as to the exact part played by milk in the spread of tuberculosis. Calmette states that the specificity of human or bovine bacilli is not absolute. Eber succeeded in infecting calves with human bacilli after passage through guinea pigs, and recov-

ered from the lesions in the calf bacilli which appeared to have the bovine character, while cultures taken direct from the human sources employed in the experiment had the human characters. The possibility of transforming the one type into the other cannot be regarded as conclusively proved by these experiments, and it cannot be asserted that such a transformation habitually occurs in nature, but it would be dangerous to assume this transformation impossible. Bovine tuberculosis, where it exists, constitutes a real menace to man on account of the susceptibility of young children to this type of infection. The mode of entry of the bovine bacillus is mainly by ingestion of tuberculous milk. Since infants are clearly susceptible to bovine infection, they should be protected against the opportunities of contamination. It must be recognized that the principal source of human contagion is familiar, and measures of protection must be framed with this fact in mind. While it may be admitted that early slight infection may produce resistant individuals, such persons require guarding against later infections lest they increase the already large numbers of disseminators of tuberculosis.—*Tuberculosis, Leading Article, Brit. M. J., December 11, 1920, 906.*

Tuberculosis-Free Accredited Herds.—List No. 3 of herds officially accredited as free from tuberculosis, giving results to June 30, 1920, has been issued by the Bureau of Animal Industry. It shows that there have been established as fully accredited 3370 herds containing 82,986 cattle (48,471 purebred and 34,515 grade), and that 16,599 herds containing 257,577 cattle have been tested once without reactors. The number of accredited herds almost trebled within a year. Minnesota has the largest number, and next come Virginia, Wisconsin and Pennsylvania. In the work of tuberculosis eradication during the last fiscal year the Federal and State veterinarians applied the tuberculin test to 695,364 cattle, of which 28,616, or slightly more than 4 per cent, reacted.—*Communications, J. Am. Vet. M. Ass., December, 1920, lviii, 367.*

Eradication of Bovine Tuberculosis.—The work of tuberculosis eradication in the past has been impeded by a lack of coöperation between the Federal Department of Agriculture and the various state officials, by a lack of concerted action on the part of the veterinary profession, by a lack of sufficient funds provided to finance the work, by ignorance and prejudice on the part of many cattle owners, and by indifference to the menace of the disease on the part of the public in general. One by one these barriers are being broken down. Public sentiment is now strongly in favor of tuberculosis eradication. Coöperation between the State and Federal Departments of Agriculture is now being carried on successfully in 43 states. An average of about 60,000 cattle are being tested or retested monthly in the U. S. by government and state inspectors. At present the average number of reactors being uncovered monthly in the United States is about 4 per cent of the number tested. The number of reactors found shows a constant but slow decrease. Testing of range animals to a greater extent will be necessary before tuberculosis can be entirely eliminated. In the United States about 750,000 animals were tested for tuberculosis in 1919, which represents a small percentage of the 65,000,000 cattle population. During the past year there have been regularly employed in tuberculosis an average of about 250 veterinarians. The work requires at least 10 times this number. The salaries and personal expenses of these men, the indemnities paid for reactors and incidental expenses will bring the total amount to $20,000,000 annually. A law requiring the tuberculin testing of all cattle offered for sale at public auction should be incorporated upon the books of every state. There may be instances where the Bang system of placing tuberculous animals in quarantine has worked out to good advantage, but this system has been so abused in the past, and the advantages have been so remote that it should be discontinued. The intracutaneous test has done more in the past few years to promote tuberculin testing than any other factor. The speed with which the work can be carried on and the small inconvenience to the cattle owner as compared with the old subcutaneous method are its two most prominent features. Now that the United States Department of Agriculture has accepted this test, more work will be accomplished with the same force of inspectors.—*The Eradication of Bovine Tuberculosis, C. Ackley, Am. J. Vet. Med., October, 1920, xv, 473.*

Coöperative Eradication Campaign and the Practitioner.—Coöperative tuberculosis eradication is the embodiment of the greatest advance in bovine tuberculosis since the organism was first isolated and tuberculin was discovered as a diagnostic agent. Any veterinary practitioner who does not look upon this work in this light is either lacking in broadness of vision or is selfish enough to put personal gain in advance of a great public good. The eradication of tuberculosis requires systematized, concentrated tuberculin testing by men who

can make a special study of it and devote their time to it. The author objects strongly, however, to Federal or State authorities interfering with legitimate practice by allowing their own men to test herds the owners of which are regular clients of other veterinarians in the same community.—*How the Coöperative Tuberculosis Eradication Campaign Affects and Appears to the Practitioner, J. F. DeVine, J. A. Vet. M. Ass., January, 1921, lviii, 458.*

Pioneer Work in Tuberculosis Control.—The first tuberculin test made on this continent was applied in 1892 near Villa Nova, 20 miles west of Philadelphia, to a herd of purebred Jersey cattle by L. Pearson. There were 79 cattle in the herd, some of them imported and all purebred; and 51 reacted to the test. On March 16, 1892, six of them were brought to the veterinary school and killed for postmortem examination. Pearson was a student in Germany in 1890 when Koch discovered tuberculin. During the following three years Pearson used the tuberculin test in his private practice. Its efficiency and reliability were recognized by veterinarians, physicians, sanitary officials and the more progressive livestock owners when they became more familiar with it. But the opposition of some of the livestock owners and journals continued for a long time. In 1895, when the Pennsylvania State Livestock Sanitary Board was organized and Pearson became its secretary, he introduced the principle of testing herds on the voluntary application of the owner. This principle was the keystone of what became known as the Pennsylvania plan for controlling tuberculosis, and it is also one of the features of the accredited herd plan. Viewed from a purely economic standpoint, and laying aside the question of public health, the control and eradication of tuberculosis in cattle is a matter of great importance not only to the cattle owner, but also to all consumers of meat and milk.—*Pioneer Work in Tuberculosis Control, L. A. Klein, J. Am. Vet. M. Ass., January, 1921, lviii, 455.*

Immunity to Tuberculosis.—In discussing in particular the immunity of the skin to tuberculosis, Edel relates the case of a woman with lupus who developed pulmonary tuberculosis after the lupus had been cured. The lung lesions also subsided under treatment, but then the lupus recurred. He ascribes this to production of antibodies in one local process which kept the other local process under control; when this was cured, the other got a chance to flare up.—*Immuniteit en tuberculose, K. Edel, Nederl. Tijdschr. f. Geneesk., October 16, 1920, lxiv, 1522.*

Control of Air Dustiness.—There are certain principal occupations that tend to produce characteristic fibroid changes in the lungs, designated as pneumokoniosis. This predisposes the worker to infection with tubercle bacilli. Typical trades are those followed by cutlery makers, filers, grinders, abrasive workers, polishers, buffers, manufacturers of jewelry, brass workers, finishers, sand blasters, saw filers, tool makers, glass workers, marble and stone quarry men, molders, potters, and miners of copper, gold, silver, graphite, iron, lead, zinc, mica, phosphate, spar, and quicksilver. Certain standard methods for air purification have been instituted in industrial plants. They take the form of hoods, exhausts, and fume lines usually beginning at or near the work plane and following certain engineering specifications, exhausting at a place sufficiently remote and protected to control the hazards arising from the occupation. In certain occupations where it has been thought that such fume lines could not be satisfactorily installed and operated, wet processes have been introduced. In point of origin, the wet process antedates the exhaust as a means of controlling dusty operations. To a large extent these two processes have given a sense of security to the operator and the operative. A survey of a plant was made by Scientific Assistant Myron Bantrell and dust samples, from which counts were made, were taken in various rooms of the plant. The counts were of one-fourth standard unit dust particles and ranged in number from 69,000 on the roof of the building to 4,548,000 in the grinding room. These conditions prevailed notwithstanding the fact that the management complied with the state laws in every way in its wet-grinding process, using a special compound of oil and water. This survey brings out the important fact that even a strict compliance with the present laws in regard to wet grinding does not always prevent a dust hazard, and that it is necessary to have some definite method of checking up the efficiency of dust prevention devices after their installation. The present methods used for removing dusts are subject to many faults and defects, and it is only by an actual dust count at the plane of work and in the room or at the place where the process is being conducted that we can determine the efficiency of the system and the amount of protection that is afforded the worker. Tentative standards of dustiness can be created by making dust counts in any place and under any conditions desired, pending a study of living conditions. The needs in the study of the control of air dustiness are: (1) The necessity for establishing a standard

dust table of the number of dust particles of a certain size permissible in all dust-creating or dust-hazardous processes and occupations. (2) The necessity for checking the efficiency of all dust-removing systems or devices at regular intervals by an actual dust count at the plane of work and in the work room, which count must come within the limits prescribed by the standard dust table for that particular process. If in addition to these measures intensive education of employees as to their constant danger of tuberculous infection at home and in the plant is carried out and workers come to realize the hazards to which they are subjected, the present industrial mortality rate from tuberculosis may be expected to be lowered to that of the ordinary death rate.—*Recent Experiments in the Control of Air Dustiness, O. M. Spencer, Pub. Health Rep., December 3, 1920, xxxv, 2907.*

Control of the Factory Dust Problem.—There are two distinct factors involved in the production of an active case of tuberculosis—the number and virulence of the invading germs and vital resistance; but as to the relative significance of these two factors there is no general consensus of agreement. To the sanitarian who is actively engaged in the daily struggle against preventable disease it is a relief to turn to one phase of the tuberculosis problem where his feet rest on firm ground. In certain trades and occupations there is found a definite condition—the presence in the atmosphere of fine particles of mineral and metallic dust—so clearly associated with an enormous excess of respiratory mortality as to leave no reasonable doubt that the dust is the effective factor in causing the disease. The object of this paper is to review the evidence which indicates a direct causal connection between atmospheric dust and industrial tuberculosis, and to point out the practical methods by which the hazards of the dusty trades may be practically controlled. Data obtained in regard to the prevalence of occupational disease in different countries and at different periods of time must be interpreted with great caution on account of the fact that industrial processes differ so widely and change so frequently. Data should be available in the form of actual death rates, based on knowledge of the population exposed as well as on the number of deaths occurring and properly corrected for the age distribution of the group involved. Three important statistical studies have been made in the United States during the past decade. The first of these is contained in bulletins of the U. S. Bureau of the Census giving the proportionate mortality by occupations of the population of the registration area for 1908 and 1909. The second is a bulletin on the industrial experience of the Metropolitan Life Insurance Company, by L. I. Dublin. The third is contained in a series of monographs by F. L. Hoffman of the Prudential Insurance Company. It seems evident that a comparison between the Prudential figures for a given dusty trade and the census figures for all occupied males is not a fair one. Besides, the conclusion is unwarranted that the iron and steel workers experience an excessively high death rate from tuberculosis as the result of the dust hazard. Even when comparisons are made in the correct manner between a dusty trade and an average group of as nearly as possible the same general social and economic status, there must always be a large measure of doubt in regard to the significance of high tuberculosis ratios. Ratios as distinct from dates, depend on two independent variables, and a high ratio of tuberculosis deaths may be produced by a low mortality from other causes, as well as by a high mortality from tuberculosis. In England numerous statistics are available which indicate that in many industrial employments, such as metal mining, marble and stone cutting, and grinding and polishing, high tuberculosis ratios are associated with high tuberculosis rates. Even in a trade like pottery making, which is generally considered as one of the industries most affected with plumbism, the latter is far less important as a factor in the death rate than is industrial tuberculosis. In the United States the only general collection of statistics was presented in a special bulletin prepared by the Bureau of the Census for the meeting of the International Congress of Tuberculosis. The absence of an analysis by age periods detracts seriously from the value of the results. The high rates among cigar makers and tobacco workers, compositors, printers and pressmen, servants, bookkeepers, clerks and copyists, and the low rates among bankers, brokers and officials of companies are no doubt due to the age composition of the respective groups. The entire population of the mill district shows a tuberculosis rate of 200 as compared with 150 for the state as a whole. The mill population itself has a rate rising to 650, and the group of polishers and grinders a rate of 1900. The other employees of the mill are not entirely comparable in age, race, and general social and economic status with the polishers and grinders, but it is evident that the high death rate among the latter is primarily due to the hazards of their occupation. In every instance in which a heavy incidence of tuberculosis has been clearly shown to result from exposure to industrial dust, the

dust in question has been in part, at least, made up of crystalline rock. Silicosis produces miners' phthisis and is probably the chief factor in the tuberculosis among axe grinders. Exposure to lime and cement dust appears not to be associated with high tuberculosis rates. Coal dust, if it has any effect, appears to exert a protective influence against the invasion of the tubercle bacillus. A clearly marked fibrosis, anthracosis, follows the inhalation of coal dust, and this condition appears to favor a high mortality from acute respiratory disease; but the tuberculosis death rate among coal miners is uniformly and characteristically low. The reason for this difference between the effects of different dusts is still largely a matter of speculation. It may be due to physical or chemical influences. With regard to a great intermediate group of other industries which have commonly been classed as dusty trades, the authors are inclined to await further and better statistical evidence before reaching a final conclusion as to the existence of industrial tuberculosis. —*Industrial Tuberculosis and the Control of the Factory Dust Problem, C.-E. A. Winslow and L. Greenburg, J. Indust. Hyg., January, 1921, ii, 333.*

Racial Differences in Tuberculosis.—From a table showing the incidence and mortality of tuberculosis in the British Expeditionary Force in France in 1918 it is evident that the incidence and mortality vary inversely with the degree of possibility of previous contact with the tubercle bacillus. The Africans, both the Kaffirs of the South African Native Labor Corps and the Cape Boys of the Cape Colored Labor Corps show an appalling incidence and mortality. The Indian Native Labor Corps comes next, then the Chinese. The incidence and mortality of the British troops, drawn from the almost universally infected communities of a highly organized and largely urban population, are relatively inconsiderable. Here there can be no question of alcoholic excesses, bad housing, insanitary surroundings or unsuitable food. The suggestion that there is an hereditary tendency more marked among the children of tuberculous parents than in the rest of the community must be seriously called in question in view of the extreme susceptibility shown by persons coming from a parent stock in which no tuberculous taint can have existed. The essential factor in susceptibility would appear to be largely unconnected with race, but to depend rather upon an absence of acquired resistance to infection. This acquired resistance can only be attained by contact with the tubercle bacillus. It is probable that the diminution in the tuberculosis death rate so marked throughout Great Britain in the last fifty years has depended less upon the efforts of stamping out tuberculosis than upon the natural processes of autoimmunization that have gone on coincidently with the developments of industrial life. While there should be no slackening of the effort to control the spread of infection, it should be clearly recognized that this infection is much more dangerous at certain periods of life and to certain individuals than to the community in general. Infants and young children are virgin soil. If the efforts of all those engaged in attempting to prevent the spread of tubercle bacilli, human and bovine, were so far successful as to ensure that every young man and woman reached the wage-earning period without any contact with the germ, it is possible that the whole population would end by being as susceptible to infection as are the African tribesmen in their native isolation. This equivocal success is never likely to be obtained, and we are quite safe in doing all we can to guard against infection. Our best efforts can hardly do more than ensure that the omnipresent tubercle bacilli shall be ingested in minimal immunizing doses, rather than in such quantities as to prove too much for the gradually developing resistance. The future of tuberculosis prevention lies in the deliberate exploitation of immunization by means of vaccinating doses of dead or attenuated bacilli.—*Racial Differences in Susceptibility to Tuberculosis, S. L. Cummins, Brit. J. Tuberc., October 1920, xiv, 160.*

Tuberculosis in Soldiers.—Valuable lessons can be learned from experiences in the army and among prisoners of war in regard to prevention and treatment of tuberculosis. Chief among them is the necessity for not limiting the search for tuberculosis to those with active lesions or the suspects. Those predisposed to the disease can be recognized by their physical aspect, the vertical, pendulum or drop heart, movable ninth and tenth rib, asthenia, dyspepsia, low pressure, tachycardia, the morbid susceptibility of the respiratory apparatus, "respiratory claudication" and respiratory incapacity of the apex, but above all by the diminution of vital capacity, hypotrophy and tenderness of the outer margin of the trapezius, and hypertrophy of the sternocleidomastoid, especially on the sound side. The amyotrophy and tenderness of the trapezius are not consequences but accompaniments of the tuberculous process, as also the sinking in of the chest wall and the diminished expansion. They may even precede manifest lesions as they are a neurotrophic reflex between the

lung and the respiratory muscles. In radioscopy, special attention should be paid to the smaller size of the lung space above the clavicle, especially if unilateral, to its less distinct aspect, and to the lesser movability of the diaphragm. Differentiation is rendered easier by the fact that in other pathologic conditions the lesions are liable to change about and vary from time to time, while the tuberculous are comparatively stable.—*Rilievi sulla tubercolosi polmonare nei soldati e nei prigionieri di guerra, G. Boeri, Rif. Med., August 14, 1920, xxxvi, 736.*

The Mononuclear Phagocytes of the Lung.—In the present state of our knowledge, there is no reason to believe that free independent cells, endowed with the faculties of amoeboid movement and phagocytic activity arise from the tissues broadly classed under the term epithelium. It is clear that the mononuclear phagocytes of the lung are cells possessing these qualities. The present study was undertaken with the object of obtaining further data on this subject. It is limited to the reactions as found in the lungs of experimental animals, following the intratracheal injection of foreign particulate matter. Vital staining was also used to mark the large mononuclear wandering cells, after the method of Sewell. Rabbits and guinea pigs were employed, but rabbits were more suitable for repeated intravenous injections. The stain was injected intravenously in doses of about 5 cc. daily, except Sunday. The findings in the lung in vitally stained but otherwise normal animals would indicate that there is a succession of endothelial cells proliferated from the capillary linings which wander into the alveoli. These cells take up vital stains fairly readily during proliferation and are thus more or less definitely marked and may be identified in their subsequent activities. These cells are demonstrated in the experimental animal not only as morphologically identical with the dust phagocytes of the alveoli, but also to serve as dust phagocytes in the alveoli. The pigment has been shown to be rapidly taken up by large mononuclear phagocytes, which show the morphological characters and faculty of amoeboid movement possessed by the wandering mononuclear endothelial cells. The origin of these cells has been shown to be by proliferation from the endothelial cells lining the blood capillaries of the alveolar walls, whence the newly formed cells migrate directly into the alveolar spaces by passing between the cells lining the alveolus, to take up their phagocytic function. From their field of activity in the air sacs, these phagocytes have been found slowly returning to the interstitial tissues of the lung with their loads of carmine, and carbon particles frequently, wandering very gradually into the terminal lymphatics and so along these channels to their eventual goal, the peribronchial lymph node. Anthracosis in the animals used only served to emphasize the similarity of the response in the experimental procedure to that in the natural process of anthracosis. The author's findings are in agreement with the recent studies of Foot. The whole mechanism of dealing with foreign particles of essentially inert materials in the lung, as found in the natural event of anthracosis, or in the broadly similar lesions artificially induced in various ways seems inadequate and rather of the nature of a makeshift. Such materials, gaining entrance to lung alveoli, seemingly constitute a type of irritant for which there has not been developed a perfect defense mechanism, so that the process known as anthracosis is the result of failure on the part of the moist membranes of the upper respiratory tract and the ciliated epithelium of the bronchial tree to remove foreign particles from the body. This failure makes every city dweller subject to a slight but constant accumulation of an irritant unavoidably inspired into the ultimate alveoli, where it sets up a reaction similar to that against a mildly irritating foreign body in any tissue. The end results of this process have been discussed by Klotz and Haythorn. What has been said of the disposal of foreign inert materials also holds true for tubercle bacilli. It is believed by Permar that by analogy a clear picture of the mode of origin of the isolated tuberculous lesions in the peribronchial lymph nodes can be formed.—*An Experimental Study of the Mononuclear Phagocytes of the Lung, H. H. Permar, J. Med. Research, July-September, 1920, xlii, 9.*

Tubercle Bacillus as Fat Fungus (Fettpilz).—The extensive investigations of the conditions for the fatty degeneration of fungus cells which have been carried on during the last five years in the *Institut für Gärungsgewerbe* by Lindner and his coworkers with the support of the war committee for oils and fats have shown that the tubercle bacillus like the Eudomyces vernalis can undergo such fatty degeneration as to lose its reproductive powers. Sugar and alcohol and alcoholic vapors inhibit the growth of Eudomyces vernalis by causing fatty degeneration. This degeneration is impossible without sufficient oxygen. The dried tubercle bacilli contain 42 per cent fat. This is the cause of their acidfast properties. Alcohol has a noxious result on the tubercle bacilli in vivo. In some sanatoria large

doses of alcohol are given empirically. To produce fatty degeneration alcohol and oxygen must act together on the tubercle bacilli. The rest cure in the open increases the oxygen content of the blood; good food with measured doses of alcohol or sugar furnish the other prerequisites for the fatty degeneration of the tubercle bacilli. With the present high cost of alcohol the inhalation of weak alcohol vapors may be more expedient. Thus the fat fungus biology opens a new perspective for the fight against tuberculosis by means of old approved remedies.—*Neue Wege zur Bekämpfung des Tuberkelbazillus in seiner Eigenschaft als Fettpilz, P. Lindner, Tuberculosis, October, 1920, 250.*

Effect of Amino Acids on the Growth of Tubercle Bacilli.—Tubercle bacilli were grown in two sets of broth. Both had a glycerol-meat infusion basis, but A contained 2 per cent Difco peptone and B 1.7 per cent Difco peptone plus 0.3 per cent aminoids. A analyzed as follows: solids 9.22 per cent, ash 1.05 per cent, phosphoric acid 0.116 per cent, nitrogen 0.348 per cent, nitrogen precipitated by zinc sulphate 0.110 per cent, and nitrogen as amino acids 0.098 per cent. The corresponding figures for B were 9.19 per cent, 1.00 per cent, 1.76 per cent, 0.369 per cent, 0.098 per cent, and 0.13 per cent, showing a marked increase in phosphoric acid and amino acid nitrogen. Growth of the tubercle bacillus was much better on B. Varying concentrations of aminoids were tried and 0.3 to 0.5 per cent found most satisfactory. Increased growth was probably due to the increased phosphorus as well as amino acid nitrogen, phosphorus being an important constituent of the tubercle bacillus in lecithin and nuclei acid molecules. The osmotic pressures of plain and glycerol broth (5 per cent glycerol) were compared and found to be 7.2 to 10.8 atmospheres and 31 atmospheres, the glycerol thus increasing osmotic pressure threefold.—*A Note on the Effect of Amino Acids on the Growth of Tubercle Bacilli, P. Masucci, J. Lab. & Clin. Med., November, 1920, vi, 96.*

Morphology of the Sputum in Pulmonary Tuberculosis.—In a previous communication a method had been described for the morphological study of the cells in sputum. The principle of this method was the wet fixation of the smear. The sputum is collected in a sterile Petri dish and examined at once. A smear is made with light pressure. This is fixed in absolute methyl or ethyl alcohol for three to five minutes, or the slide may be fixed in the stain for three minutes. The stain is 1 per cent methyl alcoholic solution of magdala red, 1 part, 1 per cent methyl alcoholic solution of thionin or toluidin blue, 20 parts—mixed just before use, diluted with equal parts of distilled water and allowed to stand for thirty minutes. Wash, blot and before drying add or place in absolute alcohol for three minutes. Add xylol until the smear is transparent, blot, add cedar oil and cover with glass. By this method nuclei are stained with the thionin or toluidin blue, also all basophile subtances. Magdala red stains the acidophile substances, namely, eosinophile granules, Charcot-Leyden crystals, etc.

The results are embodied in the following conclusions: (1) Phagocytosis of tubercle bacilli is a frequent occurrence in the sputum. It is of no prognostic significance. In 92 instances it was absent in only three. Polymorphonuclear neutrophiles, and exceptionally alveolar epithelium, are phagocytic. As many as 40 bacilli were counted in a microphage or small phagocyte. Phagocytosis varies in the same patient within short periods. (2) Size and morphologic characteristics of the bacilli are of no prognostic significance. The occurrence of short rods in acutely progressing cases is confirmed. Branched, thread-like or clubbed forms are frequently found. Possibly these are degeneration forms. (3) Eosinophiles are frequently found in the sputum of the tuberculous. Mast cells are seldom seen. There is no connection between the presence of eosinophiles and asthma. They have no prognostic significance. (4) Epithelioid cells are frequently found in the sputum. They occur singly or bound together, and may lead to the formation of giant cells. Confusion with lymphocytes is possible. (5) Giant cells from macrophages of the sputum are described. Typical Langhans cells were occasionally seen in unfavorably progressing cases.—*Untersuchungen über die Morphologie des Auswurfes bei Lungentuberkulose, E. Liebman, Zeitschr. f. Tuberk., September, 1920, xxxii, 341.*

Bacterial Flora of Tuberculous Sputum.—Strobel carried on these investigations while on temporary relief duty at the Meriden Tuberculosis Sanatorium, Meriden, Conn. The following problem presented itself: Is there any morphological change in the tubercle bacillus before, during or after hemoptysis, and is there a constant presence of Gram positive cocci? Only 5 hemorrhages occurred during Strobel's presence at the sanatorium. In all, acidfast bacilli were found, presenting a markedly granular or broken-down rod which held the stain well against an acid. Gram positive cocci

were observed in all specimens. These were arranged singly, in pairs, in chains and in tetrads. From these specimens guinea pigs were inoculated without any previous chemical treatment of the sputum. One pig died twenty-two hours after injection. The liver and spleen were greatly enlarged and adherent to the stomach. Large tubercle bacilli were found in abundance in smears from all organs. The second pig died thirty-five days after inoculation. Lymph nodes, liver and spleen were greatly enlarged and the intestines were matted together by numerous adhesions. On the right they were strongly adherent to the parietes; on the left there was a large abscess. Smears from all these organs contained abundant tubercle bacilli. No Gram positive organisms were found in smears from these autopsies. Later 4 more hemorrhages occurred. The sputum of all contained tubercle bacilli and Gram positive cocci. A rabbit was inoculated with sputum from each of these cases. One rabbit died in twenty-four hours showing marked congestion of the lungs and liver. Blood smears contained large encapsulated diplococci in great numbers. The second rabbit died on the ninth day. There was a severe peritonitis. Encapsulated diplococci, but no tubercle bacilli, were found in the pus. The other two rabbits died of lobar pneumonia and pneumococcic septicemia. In all patients after hemorrhage had ceased the microscopic picture of the sputum had not changed. There were therefore two widely different infections in these animals. The guinea pigs died from an extremely virulent tubercle infection, while the rabbits undoubtedly died from the effects of the pneumococcus. It is concluded that no relation existed between the Gram positive cocci and the acidfast bacilli in these instances. The marked beading of the tubercle bacilli originally was probably due to the poor culture medium in which it was growing. As soon as the culture medium was improved (guinea pig) they began to grow luxuriantly. —*The Bacterial Flora of Tuberculous Sputum, J. E. Strobel, Med. Rec., December 25, 1920, xcviii, 1060.*

Value of Inspection in Diagnosis of Tuberculosis.—The importance of inspection in the diagnosis of pulmonary tuberculosis is emphasized inasmuch as the findings so obtained often will lead to a diagnosis. However, other aids should not be neglected. Tuberculosis, although the lesion may be localized, manifests itself by secondary changes in every organ of the body; in fact, in every tissue, and these changes may be perceived by inspection. For example, two types of hands are found, the one where the ends of the fingers are clubbed, the other where they are long and thin and tapering. The curvature of the nails is accentuated, not only laterally but longitudinally. The color of the nails is interesting and important. Attention should be directed to the arms, the axillae, the head and the neck; the hair, the facies, the ears, the eyes, the color of the cheeks, the chin and the jaw, the mouth, the tongue and the chest. Much information may be obtained in this way and serve as a basis for a diagnosis, when accessory aids to diagnosis have failed.—*Practical Points in Diagnosis of Pulmonary Tuberculosis, J. Crockett, Glasgow M. J., September, 1920, cxiv, 129.*

Differential Diagnosis of Early Tuberculous Joints.—In a short note emphasis is laid upon the fact that obscure joint disease which responds favorably both in subjective symptoms and objective signs to hot air treatment is usually nontuberculous in origin. Tuberculous joints, on the other hand, show no improvement when so treated. —*Zur Differentialdiagnose bei beginnenden tuberkulösen Gelenkerkrankungen, J. Oehler, Münch. med. Wchnschr., July 16, 1920, lxvii, 845.*

Diagnosis of Active Pulmonary Tuberculosis.—From an analysis of 67 cases in which 150 differential counts of the white cells, together with Arneth counts, were made, and of 30 cases in which 250 total counts were estimated, the following conclusions were reached: (1) If consecutive daily leucocyte counts are made a variation of total numbers of white cells is found in all active cases of pulmonary tuberculosis—a variation in excess of that occurring normally in health. (2) Physical signs in the chest may give little or no help in determining the activity of a lesion. For instance, a cavity in the lung may be followed by pathologic repair and clinical quiescence, and in such a case the total leucocyte count may be small, and the Arneth count but slightly altered. Conversely, there may be a definite "leucocyte swing" and a marked "deviation to the left," in cases showing no other objective sign of active disease. (3) The total leucocyte count bears a definite relationship to the acuteness of the lesion in the chest, and the acuteness of the lesion has, in turn, a more or less intimate connection with the presence of organisms other than the tubercle bacillus. (4) The Arneth deviation to the left (a phrase synonymous with an increase in cells of class I and II, that is, those with one or two nuclear segments) is established in all cases of active

disease. The more severe the infection the greater is the deviation to the left. (5) An approximation of the quantitative and qualitative blood picture to the normal is a favorable sign and indicates quiescence.—*A Contribution to the Diagnosis of Active Pulmonary Tuberculosis, J. B. McDougall, Lancet, August 21, 1920, cxcix, 390.*

Complement Fixation.—Tests were made on patients with gastrointestinal disturbances regardless of the presence or absence of clinical tuberculosis. Contrary to the opinion of Ives and Singer, two cases of arrested tuberculosis gave positive reactions. On the other hand clinically active cases gave negative reactions. The principle of Hecht was therefore tried. In the original complement fixation technic, the amboceptor is not destroyed, and in addition a titrated amount of amboceptor is added. An excess of amboceptor is thus present in the serum, consequently giving a negative reaction when it really should be positive. The Hecht modification tries to avoid this error, Petroff, Miller and Fleischer-Ives antigens were used. In the Hecht modification, the hemolytic index of the blood examined was determined by adding varying amounts of normal saline to 0.1 cc. unheated serum. With the original method there were 4.98 per cent positive reactions, in cases diagnosed non-tuberculous. The Hecht modification gave 9.96 per cent. Of 10 tuberculosis suspects, the original technic gave one, the modification two strongly positive fixation tests. Of eleven cases of clinical tuberculosis, four or 39.6 per cent were positive with the original technic, six or 59.4 per cent with the modification. The modification, therefore, gives a larger percentage of positive results than the original technic. The Petroff antigen gave more positive results with the original and modified technics than did the Miller or Fleischer-Ives antigens.—*The Value of Complement Fixation Test in Tuberculosis, Roy Upham and A. J. Blaivas, J. Lab. & Clin. Med., September, 1920, v, 784.*

Differential Diagnosis of Tuberculosis.—A correct positive diagnosis is much oftener missed than it is wrongly made. Most nontuberculous diseases of the lungs occur in the middle or lower lobes. When the apex is clear only positive sputum should justify a diagnosis of tuberculosis. Most nontuberculous diseases of the lungs are comparable only with advanced tuberculous disease. When tubercle bacilli are absent after repeated examinations, the disease must be referred to some other cause than tuberculosis, even if the symptoms and physical signs are those of an advanced tuberculosis. A patient should not be condemned as tuberculous upon a suspicion. Spitting of blood may come from many causes, and alone does not justify a diagnosis of active tuberculosis. The differential diagnosis is sometimes difficult or impossible at the first examination, and requires time and observation. Diseases of the upper respiratory tract, like chronic pharyngitis, adenoids, diseased tonsils or nasal sinuses, may produce a chronic cough, blood-streaked sputum, rise of temperature, loss of weight and strength, but tachycardia and bacilli in the sputum are absent. The cough is likely to be more pronounced and may have lasted for years. Bronchopneumonia and lobar pneumonia may be the beginning of an acute tuberculosis. Time alone can differentiate. In subacute or avirulent lobar pneumonia the physical signs may persist for a considerable time together with the cough and sputum. The physical signs, however, are at the base and the sputum is negative. In influenza, the sputum is purulent and constantly free from tubercle bacilli, and the constitutional symptoms are not as marked or progressive as in tuberculosis. In bronchitis there is no impairment of resonance and the râles are generally confined to the base. The general condition of the patient is good. The association of asthma and tuberculosis is rare. Bronchiectasis may involve a large part of the lung; there may be one or more discoverable cavities. The physical signs are those of an advanced tuberculosis, and there is often hemoptysis, but tubercle bacilli are absent. Pulse and temperature are usually normal and there is no great deterioration of the general health. In empyema, abscess and gangrene of the lung the physical signs are in the middle and lower lobe. Exploratory puncture and the finding of leucocytosis together with absence of tubercle bacilli clear up the diagnosis. Cardiac lesions with hemoptysis, cough, emaciation, dyspnea on exertion and râles which may be in the apex are differentiated by the evidence of cardiac disease and the history. Other diseases to be differentiated from pulmonary tuberculosis are diseases of the pleura, cancer and syphilis of the lung, actinomycosis, aortic aneurysm, anemia, neurasthenia, dyspepsia, anorexia, and hyperthyroidism.—*The Differential Diagnosis of Tuberculosis, E. O. Otis, Boston M. & S. J., December 16, 1920, clxxxiii, 695.*

X-ray Examination of the Chest.—X-ray examination of the thorax has now reached a point where it should be regarded as a routine part of the examination and should no more be omitted than should

auscultation or percussion. In any particular case it may yield no more information than has already been obtained by a clinical examination, but many times it will give the most unexpected results and radically alter diagnosis, prognosis and treatment. The radiologist and the clinician must coöperate. In fluoroscoping the chest the importance of diminished diaphragmatic movements has been recognized for years, but in Berry's experience there is a stage of diagnostic significance preceding that of actual limitation. This may take the form either of the diaphragm descending in a series of short, jerky movements instead of an even sweep, or it may be seen that the diaphragm on the affected side commences to descend later than on the normal side, though it eventually has the same range of movement. In studying structural changes, gross or fine alterations may be looked for. Gross changes can be seen on the screen; for the fine points plates must be used. Dilatation or aneurysm of the aorta can be recognized even though utterly unsuspected and may throw much light on the true diagnosis. Enlarged glands at the root are common and appear as shadows of varying density with somewhat hazy edges. If the glands are calcified the shadows are denser and the edges more clearly cut, this point referring also to nodules in the lung tissue. Areas of lung consolidation are denoted by shadows of various depths. Frequently a shadow which appears on the screen to be of homogeneous density is seen on the plate to consist of an aggregation of many smaller shadows overlapping each other to a greater or less extent. It should be noted whether the shadows show a lobar distribution, whether they are more marked in the mesial or peripheral portions of the lung, whether they follow the line of the bronchi, whether they are associated with glandular enlargement, whether there is any evidence of calcification. Cavities in a typical case are seen as more transparent areas which may be surrounded by a dense band representing sclerosed lung. Sometimes this sclerosed area is absent and the cavity may escape attention, as may also be the case if it be full of secretion at the time of examination. Occasionally a cavity is seen to be half full of fluid when the patient is erect, the upper limit occupying a horizontal line. In the root area especially, dilated bronchi with thickened walls may be mistaken for cavities. Thickening of the pleura is recognized by a uniform veiled appearance, either confined to a localized area or spread as a uniform fog over the entire side from base to apex. In pleural effusion the opacity is greater and the heart is usually displaced to the opposite side. Examination in the erect posture shows the upper border of the shadow as a curved line with the concavity upwards, the inner end of the lung being close to the lung root and the outer end on the axillary wall of the thorax on a higher level. If the fluid is free it spreads itself out when the patient is recumbent and casts a shadow of uniform density over the whole of one side of the thorax and may exactly simulate pleural thickening. Localized effusions enclosed by adhesions show considerable opacity with fairly defined edges. The typical empyema occurs on the lateral wall of the thorax, but localized effusions are also recognized on the diaphragm, the mediastinum and in the interlobar furrows. Pneumothorax and collapse of the lung are shown by unusually translucent areas in which no lung markings are visible. If the pleura be free from adhesions and the collapse complete the lung contracts to a small area around the root and will be shown as a dense shadow while the remainder of the hemithorax is unduly bright. Sometimes a small localized pneumothorax may simulate a cavity, especially when near the apex. If fluid be present in addition to air the appearance is very striking, the affected side showing a dense shadow in the lower part of the thorax and a very light area above, the dividing line being quite sharp and always horizontal, whatever the position of the patient. Waves may be seen on the surface of the fluid if the patient is shaken. Lung abscesses show as rather poorly defined areas of opacity with evidence of breaking down in the centre. Usually the root glands are enlarged and the appearance may be mistaken for lobar tuberculosis, but the small nodular shadows are missing. Lobar pneumonia gives a shadow corresponding to the area of the affected lobe, its density ranging from slight obscurity in the congestive stage to great opacity in the stage of hepatization. The picture of bronchopneumonia is very similar to that of disseminated tuberculosis. Chronic bronchitis leads to peribronchial thickening which must be distinguished from that of tuberculosis. Anthracosis and silicosis almost exactly simulate the appearance of disseminated tubercle except for the absence of nodules. In every case, the history and clinical course must be taken into consideration—*Basic Principles in X-ray Examination of the Chest, M. Berry, J. State Med., December, 1920, xxviii, 368.*

X-ray Diagnosis in Phthisis.—The large central shadow observed in the normal thorax is due to the heart and mediastinal contents. Extending out laterally are the heavy shadows caused by the large or stem

bronchi. On the right side ascending and descending bronchi are distinctly seen, but on the left, due to the intervention of the cardiac shadow, the greater part of the descending bronchus is not visible. The density of these shadows increases with age, being as a rule much heavier in the adult. Radiating from these markings are finer lines which project into the lung field for varying distances, but do not extend normally to the surface of the lung. These markings are produced by the walls of the bronchi and the blood and lymph vessels with their contents. In the examination of an individual it must be determined what is normal for that individual. The identical roentgenogram may be perfectly normal for a man of seventy, but highly pathological in a man of twenty. Cases of chronic tuberculosis group themselves into those showing glandular involvement as in children, those showing peribronchial infiltration and those showing parenchymatous changes. Any or all of these types may be found in incipient or moderately advanced cases. In the glandular type of tuberculosis, whether seen in children or adults, there is a mediastinal group and a pulmonary group of glands to be considered. The mediastinal group includes all the tracheobronchial glands. These glands are located in the median line between the sternum and vertebral column. Unless enlarged to such an extent that they extend beyond the median shadow they are best seen in oblique position at the level of and above the sixth rib, posteriorly. Infection of these glands alone usually follows the infectious diseases of childhood and on examination is revealed as an indefinite shadow mass in the otherwise clear mediastinal space. The hilum group is made up of many intrapulmonary peribronchial glands. Involvement of this group often does not give rise to any special clinical symptoms and is found with simple bronchitis and bronchiectasis. It is well seen in dorsal or ventral plates, appearing as discrete areas of increased density more or less well defined, depending on the stage of the pathological change. An etiologic diagnosis cannot be made from the appearance of the roentgen plate or screen alone. There are, however, certain changes noted in the parenchyma and seen as minute islets of increased density in selected localities (the first and second interspaces near the median triangle and toward the periphery of the lung near the angle of the scapula) which represent conglomerate tubercles such as one sees on gross section of the lung at necropsy. The roentgen ray in the majority of cases reveals a more extensive lesion than is found by physical signs.

Not only the extent but the X-ray appearance of the lesions is of value in prognosis. The so called interlobar pneumothoraces which show as annular areas of increased density on the X-ray plate are often definite evidence of softening of the lung. These areas probably represent the so called silent cavity. They are seldom diagnosed clinically and indicate a somewhat graver prognosis. In experienced hands the question of activity can be decided by X-ray alone. Well defined calcified areas of increased density are old processes. Fibroid changes denote chronicity. Well walled-off cavities indicate healing. A cavity partially filled with pus, as well as hydro- and pyopneumothorax, denotes activity. Mediastinal shadows though dense often give no physical signs. Glands enlarged sufficiently to cast definite shadows are still beyond the reach of percussion and auscultation. Patients who on physical and constitutional signs are incipient pass on to a more advanced stage when examined by the X-ray and in some supposedly moderately advanced cases cavities are found where physical signs gave no evidence of them.—*X-ray Diagnosis in Phthisis, F. W. O'Brien, Boston M. & S. J., December 16, 1920, clxxxiii, 702.*

The Dunham Fan in Roentgenograms.—The Dunham fan is a triangular shaped increase of density on a roentgenogram usually found at the end of a trunk composed of a bronchiole, blood vessels, lymphatics and connective tissue. The size of the fan is determined by the number of lobules involved. The type of pathology influences the character of the density. In advanced conditions, there is a diffuse density with fans showing here and there, many of them irregular in size and shape. The characteristic marking of a plate of pulmonary tuberculosis consists of fan-shaped density with the apex toward the hilum. and the base toward the pleura, the apex being connected with the hilum by a heavy trunk. Two or more such areas indicate tuberculosis, the greatest density indicating the oldest lesion. There may be great variation of density in the fan, varying from radiating lines (known as linear markings) to a heavy blotting-out effect. The most striking characteristic lies in the varying degree of change in the different trunk groups, for one trunk may be involved while the one next to it may be absolutely clear. In the early adult cases the lesions are usually limited to the trunks of the upper lobes, particularly the first interspace trunk. If the linear markings are cottony or faintly obscured as by a cloud effect, and if the fan appears to be wide open, active tuberculosis

must be considered. If the linear markings are sharply defined, dense, and show sharp studding beyond the trunk, with the fan partially closed, a healed lesion is to be suspected. Caseous bronchopneumonia gives a picture showing a definite, heavy flocculent density, usually in the more dependent parts of the lungs, rarely in the apices. The fan may or may not be seen. If the lesion is small and near the pleura, it is usually walled off by a heavy septum with flocculent densities beyond the trunk. If the lesion is large it is frequently impossible to make out the borders of the triangles. With a condition such as this there is usually an old lesion at the apex, and frequently a cavity is seen. In miliary tuberculosis the lung areas are spotted with fine, cottony granules of increased density, which may be discrete or confluent. They vary from faint shadow effects to brilliant discrete areas due to calcification. The calcified areas are distinguished from those of anthracosis by the fact that the latter are usually more stellate, sharper, and thicker. Before the Dunham fan was used in the roentgenological diagnosis of pulmonary tuberculosis, many early cases were overlooked.—*The Dunham Fan on Roentgenograms, P. S. Seabold, Philippine J. Sci., July, 1920, xvii, 105.*

Certain Symptomatological Aspects of Pulmonary Cavities in Tuberculosis.—Among the anatomicoclinical phases of pulmonary tuberculosis, the cavitary phase is the one that best retains its clinical individuality. In some patients who have reached the cavitary stage the general health remains good, and many do not present any of the classical signs of cavity on auscultation, the pulmonary lesion being detected by radiography. In the first place, there are silent cavities giving rise to no clinical signs, in which auscultation is almost normal so far as they are concerned. At the most does one find some incomplete percussion dulness and respiratory changes in these subjects. But there are cases of pulmonary cavitation with most deceptive symptoms and to these we would particularly call attention. There are cavities giving rise to evidences of dryness in which auscultation reveals only some crackling, an increase of the vibrations, and respiratory roughness. There are cavities giving rise to moist signs, with subcrepitant râles, moist, crackling sounds, and a blowing expiration. In these circumstances there are certainly no characteristic signs of a pulmonary cavity. The subcrepitant râles and dry crackling do not figure in the classical picture of pulmonary cavities, and in reality they usually merely indicate the condition of the pulmonary parenchyma lying between the cavity and the examiner's ear. From these facts some interesting conclusions can be drawn. The first is that the roentgen rays alone are able to reveal with certainty all pulmonary cavities, and Masselot of Tunis has shown that the frequency of unsuspected pulmonary cavities should lead to better prognoses in many cases. Once again is confirmed the general principle that the functional condition rules over the physical condition, and that in pulmonary tuberculosis in particular, the degree of tuberculous impregnation and the state or organic resistance of the subject are prognostic factors of far greater importance than the physical state of the patient. A tuberculous patient is not always to be condemned to death simply because he presents pulmonary cavities, but the condition is much more grave when the subject is hectic, no matter what may be the anatomical degree of the lesions present.—*Editorial Note, Med. Rec., December 11, 1920, xcviii, 989.*

Tenderness in Muscles as Early Sign of Tuberculous Lesion Beneath.—Reëxamination of soldiers who had been suspected of tuberculosis months before has demonstrated that those among the suspects, whose muscles in front of and behind the apex were tender, had all developed unmistakable tuberculous lesions in the interim. On the other hand, in those with normal muscles their suspicious cough and bronchitis had harmlessly subsided and they were apparently healthy. The man is examined in a room alone with two physicians; one at the back palpates the muscles while the other, in front, watches the subject's expression for a grimace of pain or for the dilatation of the pupil which occurs when sharp pain is felt.—*La recherche des troubles hyperesthésiques au niveau du relèvement musculaire des sommets peut-être utilisée pour le diagnostic précoce de certaines formes de tuberculose au cours des expertises médico-militaires, Molle, Lyon Med., October 10, 1920, xix,* 838.

The Determination of Activity According to Wildbolz.—Wildbolz collected the sterile morning urine and reduced the volume to one-tenth in a vacuum at 65° to 70°C. This he passed through a filter saturated with a 2 per cent carbolic acid solution. The filtrate was used for intracutaneous injection in small amounts and, as a control, solutions of tuberculin 1 to 1000 and 1 to 10,000 were used. A positive reaction was supposed to indicate metabolic products of active pulmonary tuberculosis. Lanz used the test in 100 surgical cases and found

a negative reaction in all nontuberculous bone conditions and a positive reaction in the tuberculous bone conditions. The degree of the reaction ran parallel with the degree of activity of the process. Six cases of tuberculosis gave a negative reaction, two of congenital lues a positive reaction. Offenbacher tried the test in 20 cases of pulmonary tuberculosis, 19 of which had tubercle bacilli. Observations were made at 24 and 48 hours. Three types of reaction were observed: (1) Those that showed a definite infiltration and reddening at the site of injection (positive). (2) Those that showed no reaction at all. (3) Those that showed no reddening but had a palpable nodule (negative). Of the 20 cases of active tuberculosis only three gave a positive reaction. It is believed that a positive reaction very likely means active tuberculosis, whereas a negative reaction has no significance. *Über die Untersuchung auf Aktivität der Lungentuberkulose nach Wildbolz, R. Offenbacher, Zeitschr. f. Tuberk., September, 1920, xxxii, 355.*

Auto-Urine and Autoserum Biologic Test for Tuberculosis.—Further experience has confirmed the reliability of the test. In this communication from Wildbolz's service, Imhof states that the responses were constantly negative in the nontuberculous and (with a single exception) constantly positive whenever there was an active tuberculous process. In some of the cases there were no clinical manifestations at the time to sustain the positive biologic reaction, but the course of the cases always brought signs of active tuberculosis before long. He applied the double auto-urine and autoserum tests to 100 persons, and usually the intracutaneous tuberculin test at the time or later. The positive response is an infiltration, palpation of a lump in the tissues; redness and necrosis are disregarded. In fact, he examines for the response with eyes shut. The auto-urine reaction naturally depends on the kidneys being functionally capable of secreting; when this is not the case the autoserum answers the same purpose, but the response is never so pronounced as with the urine. Serum obtained after clotting of the blood does not elicit a response, confirming that the antigens are combined with the formed elements of the blood. He regards these auto tests as more reliable and more delicate than the findings with clinical and roentgen ray examination. To avoid disturbing protein reactions with the blood serum, he precipitates the albumin with alcohol and heating for a minute or two. When the patient is in a condition of anergy, the intracutaneous test with his urine or serum may have to be applied to another person known to be tuberculous.—*Über die Wildbolz'sche Eigenharn- und Eigenserumreaktion zum Nachweis aktiver Tuberkuloseherde, O. Imhof, Schweiz. med. Wchnschr., November 11, 1920, 1033.*

Tuberculosis of the Ear.—The delicate structures of the middle ear are most prone to be attacked by tuberculosis at the two extremes of life. If it occurs during the last stages of pulmonary tuberculosis it is of the nature of a terminal infection. The infantile type is of greater importance, as its prevention and cure may be furthered by the work of the otologist. The great majority of cases of acute otitis in infants undergo a natural cure. Chronic otitis is a rare disease of infant life, apart from tuberculosis. Duration over two months of aural suppuration in a child under one year should lead one to suspect its tuberculous nature. The onset is gradual, and, in striking distinction from acute otitis, is unaccompanied by pain. The mere presence of discharge from the meatus may be the first sign. The tympanic membrane frequently shows more than one perforation. The lymphatic glands around the ear are enlarged, and may be the seat of caseation and abscess formation. Facial paralysis is found in about 50 per cent of the cases. Middle ear tuberculosis originates probably by the passage of infection from the nasopharynx to the ear by way of the Eustachian tube, which, during early life, is relatively shorter, wider, and straighter than it is in the adult. Very probably the original seat of infection is in adenoids where histologic evidence of tuberculosis has often been found. The infection in most cases is milkborne. Operative treatment is indicated in all cases, and should consist in the performance of the radical mastoid operation. Prognosis varies according to the environment and social condition of the patient. After-treatment on sanatorium lines is of prime importance.—*Tuberculosis of the Ear, D. Guthrie, Brit. J. Tuberc., October, 1920, xlv, 164.*

Nontuberculous Complications of Pulmonary Tuberculosis.—Some patients with positive sputum present symptoms that are blamed on the tuberculous condition and which influence the prognosis and treatment greatly if discovered and remedied. It is unfortunate that many physicians, after finding bacilli in the sputum or physical signs in the chest, stop making further examination of the patient and attribute all symptoms such as fever, chills, etc., to tuberculosis. The natural course of a tuberculous infection is toward improvement

and in any given case of apparent good resistance, with a continuation of symptoms after proper rest and hygienic treatment, some other focus of infection should be sought and treated. Postmortem examinations have shown that other infections may be superimposed in the lungs and be even more extensive, e.g., influenza or pneumonia. Five cases are reported. The fever in the first case was due to recurrent tonsillitis and subsided and remained normal after tonsillectomy. Abscess of a tooth accounted for the fever in the second case, which became normal after removal of the tooth. Symptoms of toxemia and irregular temperature were due to chronic appendicitis in the third case. Removal of an ulcerated appendix was followed by a fall in temperature to normal. A low hemoglobin content accounted for the shortness of breath in the fourth case. Iron was administered hypodermically and after a few doses breathing became normal. In the fifth case with irregular fever which was higher every third day, blood examination showed malarial parasites and, following eight weeks of quinine treatment, the temperature is normal. The improvement in the patients' mental attitude following clearing up of other infections is wonderful at times, and this increases resistance to tuberculous infection.—*Nontuberculous Complications of Pulmonary Tuberculosis, H. F. Gammons, Boston M. and S. J., December 9, 1920, clxxxiii, 685.*

Hernia of the Pleura Complicating Pneumothorax.—In Hale's search of the literature, he found no case even similar to the one reported. The patient, thirty-six years of age, had pulmonary tuberculosis with left, spontaneous pneumothorax. In the left back there was a semilunar tumor. It extended downward along the vertebral border of the left scapula, from a point about 8 cm. above the inferior angle, and upward and outward 9 cm. from the same angle. It was soft and compressible, though under some tension. To percussion it was resonant. It could be almost entirely reduced, only to reform when pressure was removed. Coughing hastened the filling out and caused a plain impulse. This was evidently an air-filled, hernial sac of the pleura. The patient did not feel very ill and after a few days in the ward, against urgent advice, he left before a photograph was taken. Five cases of hernia of the pleura, found in the literature, are reviewed.—*Hernia of the Pleura Complicating Spontaneous Pneumothorax, H. E. Hale, Med. Rec., January 1, 1921, xcix, 16.*

Pleurisy Due to Cold.—The patient, male, in the thirties, of athletic constitution, had been suffering from pain in the left side of the chest for a few days. Physical examination revealed left pleural effusion which on exploratory puncture proved to be hemorrhagic with partial hemolysis. The patient had been exposed to extreme cold acting directly on the left side, while rowing in January, so much so that the perspiration which had formed on the left side was positively frozen. A week after the first exploration the fluid had diminished and was less red. Shortly afterwards the patient recovered fully. The temperature never rose above 37.6° and the patient did not remain in bed during his illness. About two months later, he consulted a nose and throat specialist who took blood for a Wassermann test and found it positive. The luetic infection dated from November, 1919. The rapid and benign evolution of the effusion and the general constitution of the patient permit the exclusion of tuberculosis as an etiologic factor, though animal inoculations or roentgenograms had not been made. Syphilis is difficult to exclude. Pleurisy due to cold, rheumatism, syphilis and liver conditions are discussed.—*Un cas probable de pleurésie à frigore, C. Honoré, Liège méd., November 20, 1920, xiii, 1155.*

Tuberculous Myocarditis.—Various arrhythmias may be met with in chronic or acute pulmonary tuberculosis. Lenoble has personally witnessed one case of sinus arrhythmia, with alternating pulse; six cases of auricular fibrillation; two of nodal rhythm; three of premature beats; one of paroxysmal tachycardia with alternating pulse; one of prolongation of the *a-v* interval with alternation of the jugular pulse, and one showing secondary waves during the *a-v* interval. Fluoroscopic studies showed the heart to be sometimes small, as in the average case of tuberculosis; generally, however, it was enlarged as a whole or in one of its parts. The blood pressure ranged from 70 to 190 mm. of mercury. The prognosis is unfavorable in these cases because the heart disturbances are an expression of a deep-seated pathological change in the myocardium, superadded upon the tuberculous disease involving other organs. The existence of paroxysmal tachycardia or of nodal rhythm is particularly ominous. The diagnosis is based partly on the absence of a history of rheumatism or other major infections. Out of fourteen cases in which a Wassermann test was made, the author obtained only one positive result. The gross pathology of the heart was rather variable, but microscopic study sometimes yielded rather striking changes. Actual angiomas were found at the junction of the superior vena cava with

the auricular muscle tissue. Other conditions noted included fibrosis and lime infiltration about the bundle of His, perifascicular fibrous deposits, and changes in the vessel walls. In one of the cases of nodal rhythm the node of Keith and Flack was infiltrated with small primitive connective tissue cells compressing the muscle fibres. In the other case there was in addition thrombosis of the pectineal tissues. Out of nine guinea pig inoculations, two were positive. The author recognizes not only an active type of heart muscle disease in tuberculosis, viz., bacillary myocarditis, but also a type attended with cicatricial deposits due to healed tuberculosis, such deposits being responsible for the arrhythmias observed. The connective tissue deposits, as in the case of the kidneys, need not necessarily contain tubercle bacilli. These deposits are due to the sclerosing toxins of the tubercle bacillus.—*Myocardites tuberculeuses et myocardites bacillaires, M. E. Lenoble, Bull. Acad. d. Med., October 19, 1920, lxxxiv, 151.*

Surgical Tuberculosis.—In bone and joint tuberculosis the prognosis is not unfavorable if all curative hygenic-dietetic measures can be applied. Treatment of tuberculous joint lesions in children should always be conservative. Children should not creep and play around on the unprotected floor. The tubercle bacilli get into their mouths from their hands, and get into their intestines from their soiled slice of bread and butter. It would be a good plan if we followed the example of the Orientals and put off our shoes before entering the house. As to renal tuberculosis, the mortality after nephrectomy has been constantly declining until now it is less than 4 per cent. A young man free from pathologic antecedents developed a nodule in the epididymis. He was advised to take a vacation with local and general sun baths. In three weeks the sun rays had acted like a cataplasm, lighting up the cheesy focus found in the epididymis, with perforation and fistula.—*Chirurgische tuberculose, O. Lanz, Nederl. Tijdschr. f. Geneesk., October 16, 1920, lxiv, 1511.*

Tuberculosis of Spine Resembling Pyelitis.—It very seldom happens that a lesion of the spine sufficient in extent to cause nerve pressure and therefore pain does not also produce impaired motility; yet occasionally this is the case. Also it may not be possible to induce the typical pain by jar or by posture. Since, however, the pain is produced by pressure on nerve trunks or roots, these nerves are to some extent diseased and therefore there should be and usually are present alterations of sensations, in the area supplied by the nerve, and not infrequently disturbances in the reflexes. Trophic or motor changes arise later. Due attention to the neurological manifestations of the spondylitis should prevent the error made in this case. The patient, middle-aged, had lost 50 pounds in a year and was suffering from recent attacks of unilateral pain resembling renal colic, intermittent fever and pyuria. Cystoscopic examination revealed pus from the kidney on the painful side. Examination of the spine and radiograms were negative. Nephrectomy was performed January, 1920, with resulting drop in temperature and marked general improvement. The patient returned April, 1920, with physical signs and X-ray findings of disease of the vertebra.—*Tuberculosis of the Spine Resembling Pyelitis, N. B. Foster, J. Urol., December, 1920, iv, 559.*

Nontuberculous Spina Ventosa.—Cases of spina ventosa are occasionally encountered which are not due to tuberculous lesions, being the clinical manifestations of either syphilis or a sporotrichosis infection. These morbid processes, in fact, are capable of infecting bone tissue and of determining numerous clinical types, such as hypertrophic ostitis, purulent osteoarthritis, intraosseous abscess, and ostitis of the vertebrae — sporotrichotic Potts' disease. In some cases it may offer the complete clinical picture of spina ventosa. Chevalier and Darbois have published typical cases. Usually writers who have observed and described chronic sporotrichotic spina ventosa have insisted on the absence of bone lesions and the low-grade intensity of the periostitis corresponding to this clinical phenomenon. On the contrary, in the cases described by Chevalier and Darbois the bone and periosteal lesions found by radiography fully justify the term of sporotrichotic spina ventosa, the process occurring in three different types, namely, ossifying periostitis, rarefying ostitis with decalcification with a reticulated or lacunary aspect, and intraosseous abscess. The resemblance to spina ventosa is thus complete, clinically and pathologically. Hereditary syphilis may likewise give rise to analogous types and the spina ventosa of hereditary syphilis is much more frequent than has hitherto been suspected. The lesion usually attacks the thumb and index finger, often on both hands. The radiographic findings do not differ essentially from those obtained in the tuberculous variety of the process, and the most that can be said is that there is rarely any very considerable detachment of the periosteum and that the lesions are especially those of rarefying ostitis. But the true diagnosis can be made

only when other evidences of luetic taint are present and the Wassermann reaction is positive. Consequently, in all cases in which suspicion of syphilis exists a blood examination must always be resorted to. As to sporotrichosis, it has not the same predilection as syphilis and tuberculosis for young subjects and preferably attacks adult individuals. Radiograph is therefore not sufficient for making a diagnosis of the nature of spina ventosa, but it is unquestionably a very excellent auxiliary in confirming any hesitancy in diagnosis and in giving indications for proper reatment. Its usefulness is still greater when the results of radiographic treatment are to be controlled and for following the phases and progress of the process, as well as to appreciate the proper time to interrupt treatment. It must be admitted that the esthetic and functional results obtained by Roentgen ray treatment are almost always equal to those of conservative surgery, especially when the case comes under observation in its earlier phases, and in the tuberculous variety of spina ventosa advanced bone lesions with fistula are no contraindications for the treatment. Carried out with those precautions dictated by experience, the roentgen ray treatment offers no danger from the viewpoint of the integrity of the integuments or the future growth of bones. In the luetic variety a specific treatment should be instituted at the same time. *Editorial, Med. Rec., January 22, 1921, xcix, 147.*

Primary Tuberculosis of the Bladder.—Jungano reports a case in a woman of thirty-five and reviews the literature on the diagnosis and outcome. He wrote to twenty-five leading urologists to inquire their experience with primary tuberculous cystitis, and only two had ever known of an instance. One of these stated that as catheterization of the ureters had not been done, it was impossible to exclude involvement of the kidneys. Brongersma was the other, and in his case the diagnosis had been primary tuberculosis of the kidneys, but on attempting the proposed nephrectomy the right kidney was found sound. Several months later the left kidney was exposed, and was likewise found sound. The diagnosis was thus corrected to tuberculous cystitis. This patient, a woman now thirty-four, had had symptoms from the urinary apparatus since the age of ten; eighteen years have elapsed since the attempted operations on the kidneys. The general health is fair but the chronic cystitis has grown worse.—*Tuberculose primitive de la vessie, M. Jungano, J. d' Urol., x, 15.*

Genital Tuberculosis in the Male.—Barney presents among his conclusions the following which he considers of importance: (1) The epididymis is the primary focus in the genital tract. (2) It is always secondary to a focus elsewhere in the body, this focus being situated most often in the lung. (3) The prostate and seminal vesicles are invaded by the disease early and often, but after removal of the epididymis clinical cure is finally established. (4) The second epididymis becomes involved in at least half the cases, but involvement of this organ may be obviated by early resection of its vas deferens. (5) Orchidectomy is unnecessary if the testicle is free from disease, and even if affected the diseased portion can be successfully removed in many instances. Even a portion of one or both testicles is worth saving, both on account of the internal secretion and the mental effect upon the patient. After castration the sexual function may be unimpaired.—*Further Observations on Genital Tuberculosis in the Male, A. J. D. Barney, Am. J. Surg., December, 1920, xxxiv, 317.*

Tuberculosis of the Adnexa.—Three women whose tuberculous internal genitals had been removed are in perfect health now from two to three and a half years after the operation. In 4 others only one tube and one ovary had been removed, and one of the women is in good health a year later; the 3 others have all increased in weight but all have still a small fistula, two, eight and thirteen years after the unilateral castration. The fistula secretes occasionally in one, and, in another, blood oozes from the fistula during menstruation. Secondary tuberculosis was responsible for the death of 3 others. These 10 patients are the only ones that have been followed to date of a total of 28 cases of tubal or ovarian tuberculosis, with 3 deaths soon after the operation. In 3 of the women the genital tuberculosis developed from a few weeks to two months after childbirth or miscarriage. In 27 of the cases the peritoneum or adjacent organs were involved, and in 20 cases the lesions were bilateral. The genitals were involved in only one of their 55 cases of nephrectomy for tuberculosis in women, while there were 3 cases of tuberculous epididymitis in 19 nephrectomies in males.—*Quelques réflexions sur la tuberculose salpingo-ovarienne (a propos de 28 observations personelles), H. Hartman, Bergeret, and Remilly, Gyn. & Obstetr., August, 1920, ii, 3.*

Genital Tuberculosis.—In investigating the outcome in his cases of genital tuberculosis, the author has been surprised to find

the women in excellent health ten years or more after operative treatment of afebrile genital tuberculosis, and even without operative intervention. But when there were fever and night sweats, the outcome was usually fatal. However, recent favorable experiences with roentgen rays and ultraviolet rays in such cases justify great hopes for the future.—*Tuberculose der vronwelijke geslachtsdeelen, L. F. Driessen, Nederl. Tijdschr. f. Geneesk., October 23, 1920, lxiv, 1652.*

Experimental Research on Primary Tuberculosis of the Female Genital Organs.—Bauereisen injected 0.2 gm. of a bovine tubercle bacillus emulsion through an abdominal incision into the seminal vesicles of four male guinea pigs. A severe tuberculosis of the seminal vesicles, the prostate and the vas deferens developed, which extended into the epididymis, by way of the lymphatics. Tubercle bacilli were found in the bladder urine of four of the animals. There were tuberculous nodules in the peritoneum, liver, spleen and lungs. Of eleven healthy female guinea pigs laparotomy was performed on four and the cornua uteri ligated and divided. The other seven were left intact. After the wounds of those operated on had healed, the males and females were put together. Five weeks later seven of the females were killed. In four instances a typical tuberculosis of the vaginal mucosa had developed; twice an extensive tuberculosis of the cornua uteri was noted. As to direct infection of the embryo, the results were negative. However, bacilli, together with infiltration, were found in the liver of one embryo; also primary tuberculosis of the vagina; but as acidfast, that is, tubercle bacilli, could not be demonstrated, Bauereisen thinks the condition must be explained by hematogenic infection of the embryo by the mother.—*Experimenteller Beitrag zur Kohabitations tuberkulose der weiblichen Genitalien, A. Bauereisen, Zentralbl. f. Gynäkol., August 14, 1920, xliv, 905.*

Hemorrhagic Purpura and Tuberculosis.—Garin cites Schupfer's case of chronic hemorrhagic purpura with fifteen attacks in the course of fourteen years, and his twenty-six primary cases to sustain the view that hemorrhagic purpura is not a morbid entity but is merely a manifestation of some other disease. The primary disease is almost inevitably tuberculosis. In a personal case described, everything seemed to indicate a primary severe hemorrhagic purpura in a young man followed rapidly by acute nephritis which proved fatal in less than a month after the first symptoms of the purpura. Necropsy disclosed miliary tuberculosis, affecting the kidneys predominantly. The purpura, pain in the joints, etc., were merely the expression of toxic action from the tuberculosis.—*Forfora emorrhagica e tubercolosi, G. Garin, Rif. Med. October 16, 1920, xxxvi, 952.*

Tuberculous Meningitis.—The point emphasized by Libby is that severe headache of sudden onset and persistent character in an adult patient with a history of tuberculosis, either active or quiescent, should awaken a suspicion of tuberculous meningitis. And especially if taken in connection with disturbances of the motility of the eye, upper lid or pupil, or impairment of vision, this type of headache should strongly suggest tuberculous meningitis.—*Tuberculous Meningitis, G. F. Libby, J. Am. M. Ass, December 18, 1920, lxxv, 1691.*

Vaccine Therapy of Tuberculosis.—Maragliano reviews the experiences at the medical clinic of Genoa last year. Among others of special interest he reports that three tuberculous patients were given vaccine treatment and the conspicuous and progressive development of antibodies was systematically recorded. The results were as favorable as in former years in all cases adapted for active specific treatment. In one case of tuberculosis of both kidneys in particular, surprising results were realized. Teissier of Lyons has also published impressive results with the vaccine in similar cases. The vaccine is the same as that used in prophylaxis. A number of his clinically cured tuberculous patients passed through influenza without any signs of activity from their extinct tuberculosis at the time or since. For over twenty years he has been preaching that if the children exposed to tuberculosis were given systematic preventive vaccine treatment with killed bacilli, the campaign against tuberculosis would enter an effectual and positive phase.—*Lezione di chiusura al corso clinico 1919–1920, E. Maragliano, Rif. Med., July 17, 1920, xxxvi, 641.*

Tuberculin Treatment for Children.—Failure of tuberculin treatment is probably due to inability to determine the appropriate dose for the individual patient, which may be one-millionth of a milligram in one patient and one-tenth of a milligram in another of apparently the same type, owing to wide differences in tuberculin hypersensitiveness and tuberculin tolerance. The usual method of giving all patients practically the same initial dose does harm to those who should take less and is ineffectual in those who require more. The correspondence between tuberculin hypersensitiveness and tu-

berculin tolerance suggests the determination of the therapeutic dose for each patient as the amount of tuberculin that gives the minimal reaction when injected into that patient subcutaneously. In order to test the patient's sensitiveness to tuberculin, the following test is made: Intracutaneously in a patient's forearm at the same time, one ten-millionth of a milligram is injected distally, one-millionth of a milligram medially, and one hundred-thousandth of a milligram proximally, the injections being made in a diagonal line. If no reaction occurs after twenty-four and forty-eight hours, one ten-thousandth, one-thousandth and one-hundredth milligram are later injected into the other arm. If still no reaction occurs, one-tenth of a milligram and 1 mgm. are injected, and, if necessary, still later 10 mgm. The smallest dose that produces a distinct reaction is administered therapeutically, either by mouth or subcutaneously. If this dose produces a favorable reaction, increase of appetite, reduction of temperature, it is repeated every three or five days, until it loses its effect, whereupon it is gradually increased until it again produces a favorable reaction. If the tuberculin seems to produce no effect at all, it is still repeated for several weeks and then increased. At intervals, tests for sensitiveness are made by injecting intracutaneously the dose the patient is receiving, and doses one-tenth and ten times that amount. If no reaction occurs from any of these, one hundred times one thousand and ten thousand times the amount the patient is taking are injected. If the amount producing the intracutaneous reaction is greater than the amount being given therapeutically, the latter is increased rapidly until it corresponds with the former. The usual rate of increase is about 50 per cent. The tuberculin given is the T. R. It was found that it made little difference whether the tuberculin was given by mouth or subcutaneously. The author gave the tuberculin treatment seldom or never to patients who were doing well without it. The success of this method in children was demonstrated in 19 cases at the Eagleville Sanatorium, Pennsylvania. The initial doses varied from one hundred-millionth to one-hundredth of a milligram and were increased ten times to one hundred and twenty thousand times over periods from one to twenty-one months, practically without producing an unfavorable reaction. A large proportion showed improvement in general condition, reduction of temperature and gain in weight. —*A Method of Determining the Appropriate Dose of Tuberculin for the Tuberculous Child, M. Solis-Cohen, Arch. Ped., November. 1920, xxxvii, 641.*

The Martinotti Vaccine for Tuberculosis.—Out of 27 cases treated with the Martinotti antituberculous vaccine, some of which were kept under observation for a period of three years, 19 were completely cured. The first signs of improvement were an increase of appetite and an unusual sense of well being. These subjective symptoms were supported by objective signs. The cough and night sweats diminished rapidly, the weight increased, the temperature returned to normal, the respirations became less frequent, râles disappeared, the sputum became thinner, the tubercle bacilli granular and shorter and finally disappeared, and the pulse was stronger and less frequent. On the X-ray plate, the shadows of infiltrations became less intense and more circumscribed, indicating progressive scar formation. Under the fluoroscope, the diaphragm invariably resumed its motility.—*Contributo clinico alla terapia della tubercolosi polmonare col vaccino antitubercolare Martinotti, E. Ruggeri, Tubercolosi, June, 1920, xii, 169.*

Spengler's Immune Bodies.—Borgogno used the immune bodies in his dispensary at Alessandria in three types of patients: those with closed lesions, those with open lesions, but in fair general condition, and those with open lesions of a serious nature and with signs of toxemia. The immune bodies were prepared in dilutions graded according to the stages of the disease. The far advanced cases received the most dilute solutions by hypodermic injections every two or three days in increasing doses. No reactions other than a slight rise of temperature were noticed. The advanced cases were not at all benefited, contrary to the experience of Hollós. The milder cases, however, improved, especially those with closed lesions. They gained in weight and lost most of their subjective symptoms. No other treatment was given during the administration of the immune bodies, and the patients remained at their work.—*I corpi immunizzanti di C. Spengler nella terapia antitubercolare, M. Borgogno, Tuberculosi, April, 1920, xii, 109.*

Allergy or Anergy.—Those free from tuberculosis do not react to the largest doses (20,000 mgm.) of tuberculin; they are truly anergic. This would suggest that tuberculin therapy should aim at rendering patients anergic. The experience during the war seems to prove the correctness of this theory. Former patients who had been rendered anergic did not relapse while a very large number of those who had remained allergic did relapse. Many, still allergic at the time of entering military service, became anergic

in the course of time. Anergy is not necessarily the result of "biologically concluded" tuberculin therapy but rather the result of healed tuberculosis. In all his practice Krämer has never seen relapses after tuberculin therapy carried out to its biological conclusion (anergic state). Further observation must show whether patients rendered anergic by tuberculin therapy are permanently cured.—*Ist die Allergie oder die Anergie der Tuberkulösen das Nützlichere für den Kriegsdienst?, C. Krämer, Beitr. z. Klin. d. Tuberk., August, 1916, xxxvi, 57.*

Tuberculin Treatment.—A review of current opinion in different countries since Koch's publications on tuberculin treatment. Thirty years have elapsed, but no common opinion has been established upon the value of its use. In every country friends and enemies of tuberculin are still found; all grades of indifference or enthusiasm occur. Bandelier and Roepke are still admirers, while Schröder claims to see the same good results without tuberculin treatment. The French authors are divided in the same way: Jeanneret wanting to put tuberculin in the hands of all practitioners, Jousset considering its application dangerous, illogical and absurd. England and America show the same picture of divided interest. Pathologists like Virchow warned against the focal reaction in tuberculosis. Tendeloo admits the possibility of favorable outcome after focal reactions. The weak point in its application remains the impossibility of estimating the amount of good (or harm) different foci in the lungs will receive from reactions. In chronic pulmonary tuberculosis older and younger foci exist. It seems unreasonable to expect favorable results in the ordinary case of pulmonary tuberculosis on account of the pathological changes. The experience of different sanatorium men both in Europe and America indicates that patients do not lose their bacilli more easily when treated with tuberculin, notwithstanding Bandelier and Roepke's enthusiasm. Bardwell's statistics seem illuminating on this point. The results of the author are the same as those obtained by H. M. King, analyzed by Waters of Loomis, N. Y. Best results may be obtained perhaps in cases of pulmonary tuberculosis with a tendency to healing, without bacilli, where the pathological changes are nearly identical and where the risk of dangerous focal reactions is small. Laryngeal tuberculosis complicating pulmonary tuberculosis does not seem to improve under tuberculin treatment. Tuberculosis of the eye seems often to improve under specific treatment. X-ray treatment has replaced tuberculin in cases of tuberculous glands and so called surgical tuberculosis, though some cases may do well under tuberculin treatment. Tuberculin should not be given according to a schedule; individualization is necessary. The skin reaction carried out cutaneously or intracutaneously may give some clue as to the power of resistance to tuberculin. This however is not the same as resistance against the disease. The original studies of Deycke and Much, and Altstaedt and others sufficiently indicate this. It remains to be seen whether the partial antigen treatment will be more successful. Its use will be limited at its best. Its application will cause a good deal of inconvenience to the patients; and not much satisfaction can be expected from tuberculin treatment in pulmonary tuberculosis of children, notwithstanding Jeanneret's interesting work on the intracutaneous method. Petruschky's application of tuberculin as a prophylactic measure and Von Leube's advice to treat children with tuberculin who show a positive skin test do not seem suitable for general application. The problem of resistance against tuberculosis is not solved by tuberculin treatment.—*Tuberculin Treatment, P. J. L. de Bloeme, Nederl. Tijdschr. v. Geneeskunde, September, 1920.*

Operation for Tuberculosis of the Wrist.—The operation devised by Ely necessitates cutting a groove in the radius and the third metacarpal and transplanting into it a graft from the tibia. The result is said to be a useful hand, possessing as much rotation as before the operation, and with excellent power in the fingers and thumb.—*An Operation for Tuberculosis of the Wrist, L. W. Ely, J. Am. M. Ass., December 18, 1920, lxxv, 1707.*

The Internal Use of Iodine.—In 1914 Boudreau made the statements: (1) Iodine is a direct specific against tuberculosis. (2) It should be administered in moderate doses, gradually increasing to the point of tolerance. The term iodism should be changed to iodurism, that train of symptoms caused by the administration of the iodides, rather than iodine itself. Relatively enormous doses of the tincture of iodine, up to 150 drops a day, can be tolerated if well diluted. Boudreau claims excellent results in pulmonary tuberculosis even without the rest cure. This tolerance for iodine has also been noted by English physicians in cases of rheumatism. Dufour has tried iodine in the treatment of pulmonary tuberculosis but without encouraging results. He claims that in large doses this drug is the best means of treating adenitis.—*L'usage interne de la teinture d'iode à hautes doses, L. Cheinisse, Presse Méd., September 25, 1920, xxviii, 678.*